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AUTHOR Crow, Tracy, Ed.
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ABSTRACT

This issue of ENC Focus serves as a guide to 29 instructional materials that utilize some form of alternative assessment. These materials focus on mathematics, science, and integrated topics. The products included utilize one or more of the following means of student assessment: (1) portfolios; (2) journals; (3) interviews; (4) surveys; (5) performance; and (6) rubrics. The introduction contains a description and several general examples of the types of assessment used in the materials. The record for each of the products includes publisher contact information, subjects covered, grade level, a description in abstract form of the product, description of assessment procedures, author, and the Eisenhower National Clearinghouse (ENC) reference number. The products featured include: "Activities and Assessment in Mathematics"; "Algebra"; "Amazing Me: Understanding How the Body Works"; "Chances Are...."; "Change Over Time"; "Chemicals in Food: Additives"; "Dash: Grade 2"; "Habitats"; "The Hole in the Sky"; "Ice Cream Making and Cake Baking"; "If Shipwrecks Could Talk"; "Microworlds"; and "Windows on Math, Volume 2." (DDR)

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ED 461 476

Volume 3, Issue 1

FOCUS

For Mathematics and Science Education

New Approaches to Assessment in Science and Mathematics

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Eisenhower National Clearinghouse

Using ENC to learn more about assessment

The Eisenhower National Clearinghouse for Mathematics and Science Education was established to help K–12 teachers locate useful teaching materials. The Clearinghouse collects all types of materials at the National Repository in Columbus, Ohio, at the Ohio State University. ENC makes information available about all of these resources in several ways. For example, this print catalog is one of a series that highlights specific topics and resources in math and science. All of ENC's resources in combination will provide comprehensive information for teachers on a variety of topics, including assessment.

Search strategies for ENC Resource Finder

The resources described in this issue were found using Resource Finder, ENC's searchable online catalog of curriculum resources (see *How to Connect to ENC Online* on p. 1). In an initial search, 339 records were returned when the subject word *assessment* was used, including Internet sites as well as books, videotapes, kits, and more. Because we wanted to browse a smaller number of records, we limited our search using grade level and other subject identifiers such as *professional development* and specific assessment strategies. Those identifiers include *portfolios*, *journals*, *interviews*, *performance assessment*, *rubrics*, *extended response*, *lab practicals*, *journals*, and *concept maps*. The subject terms in the records provided here can be a starting point for related searches.

ENC Online

ENC Online has links to exemplary science and math Internet sites through the Digital Dozen, selected monthly, Lessons and Activities, and Educational Resources. Many Internet sites are available that have assessment components or professional development information. You can find them in two ways: search Resource Finder, or browse through the links on ENC Online. If you have time to browse, you will find all kinds of things you might be able to use in your classroom. ENC Online also links to some of the full-text articles featured on ENC CDs.

ENC CDs

ENC's CD-ROMs have a variety of previously published documents in electronic format about curriculum issues in math and science education including curriculum support materials, state curriculum frameworks, and articles from professional journals. These documents cover curriculum standards and implementation, and include the complete 1989 *NCTM Curriculum and Evaluation Standards for School Mathematics*. Teachers can read these documents if they are seeking to learn about various assessment strategies, how they can be implemented as part of the instruction process, and the reasons why assessments such as performance assessments, journals, and interviews should be used. Many of those frameworks for math and science include statements and discussions about the changing role of assessment in instruction. These documents and other valuable materials are included on ENC's CD-ROMs, which are available free to schools.

ENC Demonstration Sites

Located throughout the country, these 12 sites are located at or in conjunction with the 10 Eisenhower Regional Consortia (see inside back cover), at the Capital Collection & Demonstration Site at George Washington University in Washington, DC, and at ENC. Teachers and other educators can visit or contact the Site in their area for a complete demonstration of ENC's services as well as assistance in locating educational materials and using new technologies.

Teacher contributions to ENC

To create a better service, ENC needs the help of the Nation's educators. ENC Online's newest tool, the Educator's Kiosk, offers one place where educators can both submit and search for professional development events and opportunities, such as workshops, conferences, or grant or scholarship monies. However, this tool will only be useful if educators use and contribute to it. For more information, visit ENC Online at <http://www.enc.org>.

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ENC FOCUS

New Approaches to Assessment in Science and Mathematics

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About ENC Focus

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ENC Focus Staff

Editor: Tracy Crow
Contributing Editors: Marsha Nicol, Kimberly Roempler
Acquisitions: Denis Baker

Address comments to:
ENC Focus Editor
Eisenhower National Clearinghouse
1929 Kenny Road
Columbus, OH 43210-1079
Telephone no.: (614) 292-7784
Toll-free no.: (800) 621-5785
Fax: (614) 292-2066
E-mail: editor@enc.org

For help with ENC's online services, call the Technical Help Desk at (614) 292-9590 or send e-mail to help@enc.org.

To request copies of any issue of the *Focus* series, contact ENC at the address above, or send e-mail to editor@enc.org. Although some issues are out of print, all issues of this series are available online.

Past titles include *Equity in the Classroom, Earth Day in the Classroom, Real Data Resources for Teachers, Active Learning with Hands-on Resources*, and *Integrating Math and Science*.

How to Connect to ENC Online

To connect to ENC Online via the Internet, telnet to enc.org; via modem dial (800) 362-4448 or (614) 292-9040. Set your communication software to VT100 terminal emulation, no parity, 8 data bits, 1 stop bit, and full duplex. Once connected, press <RETURN> to bring up a screen and type c to connect. All the information you need to use ENC is on the screen. ENC's World Wide Web address is: <http://www.enc.org>.

ENC Reference Services

Teachers with questions about math or science curriculum resources can call the ENC reference staff. Reference services include locating suitable teaching materials, identifying Federally-funded programs and opportunities, and making the best use of ENC's online services and Resource Finder. Call the Reference Desk at ENC's toll-free number or dial (614) 292-9734. Send e-mail questions to library@enc.org.

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New Approaches to Assessment

Tests have been used to group and track students, diagnose knowledge and skill levels prior to instruction, measure the attainment of instructional objectives, evaluate teaching, and provide information about students' knowledge and abilities. There are many ways to gain such information but traditionally, multiple-choice exams have been the ones used most often. Being able to choose the one correct answer for each question on a multiple-choice test has all too often been the only indicator of science or math achievement. Research shows that traditional achievement tests do not measure a broad range of science processes, process skills, or higher order thinking skills; instead they measure the ability to recall facts and a student's ability to recognize information from a textbook.

Proponents of national reform movements in both science and math are calling for new forms of assessment, categorized as authentic, alternative, or appropriate. What people mean by these terms varies, but some assessment methods commonly discussed are portfolios of student work and performance assessments in which students perform a task or solve an open-ended problem. Other nontraditional assessments include interviews, journal writing, self-evaluation, role playing, and extended response.

Standards

The National Council of Teachers of Mathematics (NCTM) *Assessment Standards for School Mathematics* define assessment as the process of gathering evidence about a student's knowledge of, ability to use, and disposition toward mathematics and of making inferences from that evidence for a variety of purposes (p. 3). The *Assessment Standards* propose that assessment of students' achievement should be based on information obtained from a variety of sources and that much of this information should be gathered by teachers during the process of instruction.

The 1996 *National Science Education Standards* devote an entire chapter to discussing the importance of using appropriate assessments in science including the idea that assessments must be developmentally appropriate and set in contexts that are familiar to students and that the choice of assessment must be consistent with what one wants to measure.

Assessment should be used to provide teachers and students with information about students' evolving understandings, skills, and knowledge. Classroom assessment that is embedded in the learning and teaching process offers non-judgmental feedback as well as an opportunity for students to practice skills and apply what they have learned in a new context. It helps teachers make informed judgments about their course of instruction. The resources highlighted in this issue approach assessment two different ways. First, we chose curriculum materials that include a substantial section on assessment with the assessments being an integral part of the curriculum itself. Second, we chose materials that specifically address the professional development of teachers. We have also included selected Internet sites.

To help teachers understand what some of these assessment terms mean, here are examples of a few types of assessment pulled directly from the resources featured in this catalog. While these terms have several meanings and can be used in different ways, these examples will help to give a basic understanding of some of the assessment tools available. The professional development materials listed later in this issue will give teachers a more comprehensive understanding of assessments.

Portfolios and Journals

Amazing Me: Understanding How the Body Works contains lessons that help children in kindergarten learn about their bodies, their community, and the practice of safety skills through the use of manipulatives, learning centers, literature, student projects, laserdiscs, and CD-ROMs. This kit contains many activities designed to be included in portfolios.

Specific activities include having children take safety surveys at home based on their class lessons and safety checklists. The completed surveys go in the students' portfolio or journal. In an assessment for the lesson "Lower Body Moves," children cut out from magazines different pictures of human and animal feet and legs. They make up "Different Feet" books and sort pictures into groups of animal and people feet. Children also draw the animal or person that goes with each pair of feet. After a lesson on arm parts, students shine a flashlight under one hand and describe what they see. All these drawings and collections can become part of their portfolios.

In the teacher's guide to this kit, teachers are given guidance on reviewing students' portfolios. For example, teachers are encouraged to look at details in writing entries that show children can identify aspects of their home, community, and school lives; they are also urged to look at process rather than product throughout the year to better gauge the development of students' understanding. Teachers are also asked to discuss the students' work with them throughout the development of the portfolios, not just at the end of the unit or year.

New Approaches to Assessment

Performance-based Assessment

The materials in *If Shipwrecks Could Talk*, a kit developed for grades 6–8, help students learn where mariners sailed, the methods and tools they used to navigate, and common causes of shipwrecks. The assessment component includes a comprehensive performance-based assessment activity.

Students begin this assessment by going to a hands-on activity center that has been prepared for this assignment. With cardboard cartons and Styrofoam cups prepared to represent two types of ships, students first predict the behavior of the two "ships" based on what they have learned about buoyancy. Students then test their prediction using the ships and a tub of water, and share their observations in writing.

Students are also asked to perform a task where they add weight to their ships until they reach a certain depth but before they sink. They analyze the results and predict which ship will sink first; they again test their predictions and write about the results. In the teacher's guide to this unit, teachers are given suggested answers and guidelines on scoring the students, but the process of the entire activity is what teachers observe, not just the product.

Observations, Interviews, and Surveys

In *Using a Model* and *Estimating and Checking*, videotapes for students in grades K–2 to use in problem solving with manipulatives, the assessments include surveys and observations. The "Student Attitude Survey" will help teachers gauge their students' attitudes throughout the year, and how those attitudes change as a result of using this program. Open-ended questions in this survey include "what do you like about math," and "what do you find easiest in math."

Observation tips are included with almost all of the resources featured in this issue. In the *Innovations in Science* series, teachers are given aspects of process skills to observe, and they are instructed to do so repeatedly. For example, during an activity where students learn about the principles of archeological excavation, teachers are asked to look in particular at hypothesizing skills. The teacher's guide helps by indicating that those skills are displayed when students talk about possible explanations for things found in their "dig."

Interviews and suggested questions are also part of many of these resources. Some interviews are formal, with a list of open-ended questions, and some interviews are less formal, with questions and observations throughout activities.

Rubrics

Part of the *MathKeys* series, *Unlocking Whole Numbers: Volume 2*, allows students in grade 3 to explore mathematics in a multimedia environment by linking manipulatives, symbolic notation, and writing tools. While this package uses some of the assessments described above, it also provides rubrics to assist teachers in assessing the answers to many of the problems. Some type of rubric is often included in these resources to guide teachers.

Unlocking Whole Numbers has a rubric for the following activity. Students are asked to arrange 36 model cars or counters in equal groups and to find as many different ways to arrange them as possible. They then show or write what they did to solve the problem.

This particular rubric has four levels, with Level 4 attributes indicating the greatest understanding of the possible solutions to the problem. Examples of criteria include: in Level 4, "Explains clearly and fully how all nine possible arrangements were found"; in Level 3, "May need to polish the explanation to make it complete"; in Level 1: "Does not use a strategy for finding possible arrangements without step-by-step guidance." (*Unlocking Whole Numbers, Teacher Resource Manual*, p. TRE 29).

An example of a rubric for assessing skills in the *Innovations in Science* package discussed above delineates criteria for observing growth in skills, such as "makes predictions based on observations" and "predicts outcomes of investigations." The criteria are listed in a chart, and teachers record a number from one to five that best indicates their assessment of the skills, with one being "rarely" and five being "consistently." (*Innovations in Science, Teachers Resource Package*, p. I-88)

Professional Development Resources

A second section of this issue of *Focus* provides descriptions of professional development resources about assessment. Descriptions of math and science standards documents as well as models for assessment are provided. In some cases, this issue describes collections of assessments and can help to point teachers toward bibliographies and databases to find more information about the implementation and use of new assessment tools.

While this issue of *ENC Focus* can only describe a portion of the assessment materials that are currently available, all of ENC's services and products can lead to greater knowledge of what types of materials are available to teachers. For more information on using all of ENC's products, please read the preface on the inside front cover.

New Approaches to Assessment in Science and Mathematics

Pricing and ordering information were verified in August 1996 and are subject to change.

Title	Grades	Subject	Cost
Activities and Assessment in Mathematics	3–8	Math	249.00
Algebra	7–10	Math	89.58
Amazing Me: Understanding How the Body Works	K	Science	395.00
Beginnings	PreK–K	Integrated	565.00
Chances Are: Hands-on Activities...	3–7	Math	22.00
Change Over Time	5	Science	300.00
Chemicals in Foods: Additives	7–10	Science	19.99
Dash: Grade 2	2	Science	375.00
Habitats	3	Science	317.67
The Hole in the Sky	5–8	Science	399.95
Ice Cream Making and Cake Baking	5–8	Science	12.50
If Shipwrecks Could Talk	6–8	Science	355.00
In the Air	6–8	Integrated	24.94
Insights and Outcomes: Assessments for GEMS	K–10	Integrated	25.00
Integrating Environmental Education and Science...	K–12	Science	14.95
Integrating Mathematics, Science and Language...	K–1	Integrated	25.00
Lessons in Mathematics for the Classroom...	5–12	Math	15.00
Liquids	2–3	Science	495.00
Math Assessment: Grades 5 to 6	5–6	Math	11.95
Microworlds	5	Science	23.45
Networks, Paths & Knots	6–9	Math	39.95
Puddle Questions	1	Math	24.00
The SIMMS Project: Level 4, Volume 1	10–12	Integrated	25.30
Teacher Resource Package IV, Level 3	4	Science	70.10
The Universe: Exploring Stars, Constellations, and Galaxies	6	Science	450.00
Unlocking Whole Numbers, Volume 2	3	Math	99.00
Using a Model & Estimating and Checking	K–2	Math	49.00
Windows on Math, Volume 2	2	Math	860.00
A World to Measure...	2	Math	350.00

See records for more pricing information.

Activities and Assessment in Mathematics

Grades 3–8

Australian Council for Educational Research Ltd. (ACER)
19 Prospect Hill Road, Camberwell
Camberwell, Victoria 3124, Australia
Telephone no.: 011-61-39-277-5555
Fax no.: 011-61-39-277-5678
1 kit: $249.00 (Australian)
Also see ordering note below.

Subjects: *Assessment; Chance; Data analysis; Mathematics; Measurement; Numbers; Probability; Problem solving; Process skills; Rubrics; Spatial ability.*

1995

Abstract: This package is a collection of over 200 classroom-ready activities which cover the five strands, Number, Space, Measurement, Chance and Data, and Problem Solving, of *Mathematics: A Curriculum Profile for Australian Schools* (1994). Each activity is a separate photocopy master where the front of the page is for the child to use. Many of the activities involve children using concrete material and everyday objects. Activities are focused on conceptual understanding, skill development, or applications; and they can be used as single activities, linked activities, or with support materials. The activities may be selected by several different approaches, including the child's needs, the age or grade, or the school curriculum. The scoring criteria for activities are designed to show student development and to assist teachers in making useful judgments about student performance in relation to the objective of an activity. Suggested rubrics for organizing the scores and comments for individuals and groups are included in the Teacher's Manual. Also included is a list of every activity and whether the activity requires teacher or partner input; whether it requires a calculator or resource sheets; and whether materials other than the activity sheet and a pencil are needed. (Author/LDR)

Assessment note: Assessment activities are designed to allow children to both learn and show what they know in a variety of contexts, working individually or in pairs. Assessment criteria, on the back of each activity master, can form the basis of descriptive assessment of children's mathematical performances, be used for reporting to parents, and for planning future learning experiences. Suggested scoring and interpreting activities include scoring students' explanations because those explanations clarify math concept problems and expose mathematical strengths. On other occasions, the children's scores on an activity are meant to be interpreted as an indication of their performance relative to the focus of that activity.

Author: Brian Doig; edited and designed by Rhonda Idczak; illustrations by Julie Smith

Reference no.: ENC-007316

Ordering note: In September 1996, the exchange rate is approximately .76 American dollar to 1.00 Australian dollar. With freight charges, the publisher estimates an approximate cost of $250.00 American.

Source note: Gift of Australian Council for Educational Research Ltd. (ACER)

Algebra

Grades 7–10

ScottForesman
1900 East Lake Avenue
Glenview, IL 60025
Toll-free no.: (800) 554-4411
Fax no.: (800) 841-8939
1 text: ISBN 0-673-45765-6 $37.63
1 teacher's edition:
ISBN 0-673-45766-4 $51.95

Subjects: *Algebra; Assessment; Cooperative learning; Integrated/Interdisciplinary approaches; Mathematics; Portfolios; Problem solving; Reading; Real world applications; Technology; Writing.*

1996

Abstract: This book, for use in grades 7–10, emphasizes connections within mathematics and between mathematics and other disciplines, develops concepts through real world applications, assumes the use of scientific calculators (or computers with function graphing software), and inserts computer programs whenever appropriate to the content of the text. Topics include variables, integers, exponents, quadratic equations, factors, probability, triangle inequality, and chi square. The material is written so that students learn mathematics concepts through reading each lesson, problem solving, and projects. Assignments include questions that address the reading assignment, applying the mathematics, review, and exploration. The text uses the SPUR approach to develop various aspects, or dimensions, of understanding. SPUR is based on Skills, the understanding of algorithms (procedures) for obtaining a result; Properties, from the rote identification of properties to the discovery of new proofs; Uses, from the rote application of ideas to the discovery of new applications or models for mathematical ideas; and Representations, including the use of concrete materials and models or graphs and other symbolic representations. The teacher's edition includes the students' text pages along with teacher's notes providing additional activity suggestions, including video segments, manipulatives, cooperative learning, additional activities, alternate approaches for students who need more help, error analysis, and assessment alternatives. Reproducible problems to solve by using either an automatic grapher or short BASIC programs are provided in the *Technology Sourcebook*. There are several workbooks available which provide lesson masters; reproducible problems, charts, and graphs; and answers for all the problems in the workbooks and chapter reviews. This text is written to be consistent with recommendations in the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989). (Author/LDR)

Assessment note: This set of books includes suggestions on using and scoring several forms of assessment. Composed of large mathematical tasks, one of the tests requires students to demonstrate how they reason through difficult problems; how they make and test conjectures; how number sense helps them give reasonable answers; and how they use alternative strategies. Other forms of assessment include student surveys and individual and cooperative group self assessment; individual and group problem solving and/or observation assessments; a portfolio; traditional tests and quizzes; and a test with open-ended questions.

Author: Developed by the University of Chicago School Mathematics Project (UCSMP); authors, John W. McConnell, Susan Brown, Zalman Usiskin, Sharon L. Senk, Ted Widerski, Scott Anderson, Susan Eddins, Cathy Hynes Feldman, James Flanders, Margaret Hackworth, Daniel Hirschhorn, Lydia Polonsky, Leroy Sachs, Ernest Woodward

Series: ScottForesman *Integrated Mathematics, University of Chicago School Mathematics Project* (UCSMP)

Reference no.: ENC-003962

Standards: NCTM Standards (1989). Content Standards: Grades 5–8: Mathematics as reasoning; Number sense and number relationships; Statistics; Probability; Measurement.

Content Standards: Grades 9–12: Mathematics as reasoning; Algebra; Functions; Geometry from an algebraic perspective; Probability; Discrete mathematics.

NCTM Standards (1991)

Funding: Amoco Foundation, Inc.

Source note: Gift of ScottForesman, a division of HarperCollins Publishers

Amazing Me: Understanding How the Body Works

Grade K

Optical Data School Media
512 Means Street NW, Suite 100
Atlanta, GA 30318
Telephone no.: (404) 221-4500
Toll-free no.: (800) 524-2481
Fax no.: (404)221-4520
1 kit: Order no.: 276-1 $395.00

Subjects: *Art; Assessment; Body awareness; Careers; Environment; Exercise; Health; Human body; Integrated/ Interdisciplinary approaches; Interviews; Language arts; Life sciences; Observation; Portfolios; Process skills; Reading; Role playing; Science; Senses; Social studies.*
1994

Abstract: This kit is part of *KinderVentures*, a multisensory program developed for grade K that engages young learners in finding out about themselves and the world around them. The program is science oriented and has connections to social studies, language arts, mathematics, and the arts. It incorporates laserdiscs, hands-on activities, read-aloud stories, literature and manipulatives through the adventures of Pocket and Tails, twin Wanderoos (tm) that guide teachers and students through both familiar and new concepts. This unit, *Amazing Me*, contains six lessons that help children learn about their bodies and their community and allows them to practice safety skills. For example, "Mirror, Mirror" teaches about body image and parts of the body; "Home Sweet Home" relates family life to students' physical and social needs, growth and development, and sensory input; and "Checking Up" investigates healthy habits with doctors, dentists, nurses. Additional topics include exploring ways to exercise, meeting people in the neighborhood, and school as a place to discover new friends, ideas, and experiences. The teachers' guide provides detailed lesson plans, a bar code index to laserdisc images and movies, and both individual and group activities. Sample activities include setting up a Science Discovery Center in the classroom where students can experience classroom concepts such as touch, smell, and taste; reading *KinderVentures* stories using the barcodes to access visuals on the laserdisc; and helping children develop their own projects, such as journals, puppets, and musical instruments. Icons, located in the margins, indicate appropriate points for activities, connections, use of the Wanderoo puppets, and assessment. In addition to traditional assessments, the guide also indicates activities that would be appropriate for inclusion in portfolios or as alternative assessments. The guide also provides reproducible student worksheets, a bibliography of children's literature, and connections to other disciplines, subject areas, multicultural perspectives, careers, and basic skills. The accompanying CD-ROM teaches children about plants, animals, people, and the environment through narrated information and videos as they play hide and seek with the Wanderoos, or improve hand-eye coordination and memory skill through matching games. The kit also provides two manipulatives: illustrated Sequencing Cards and the Anatomy Apron that helps students learn about their internal organs, such as the heart, liver, and lungs, by fastening colorful fabric organs to the apron, and by coloring reproducible pictures. A Spanish version is also available. (Author/LCT)

Assessment note: The assessment component in this kit includes alternative, portfolio, and traditional assessments. The portfolios may contain such items as student drawings, collections of body parts cut out of magazines, and student-created charts. Other examples of alternative assessments include interviews, role playing, and teacher observations of the child's ability to interact in group situations, degree of independence, and contributions to group projects.

Author: Program coordinator, Stephanie Petron Cahill; unit guide authors, Bobbi Joan Bennett, Margurite L. Jarvis; science consultants, Stephen House, Linda Hsu, Stephen Roman; graphic design, Josee DeRubeis Ungaretta, James B. Ellison, Nadeem Zaidi; illustrator, Lori J. Pullis-Rummel

Series: KinderVentures; Windows on Science; Beginning Science

Reference no.: ENC-006421

Language: English; Spanish

Equipment: Laserdisc player and color monitor; barcode reader. System requirements: Macintosh; LC or better; System 7.0 or above; 4 MB RAM; 1 to 8 MB free space on hard drive; color monitor; CD-ROM drive. Windows—IBM or compatible computer; 386 or above; Windows 3.0 with multimedia support or 3.1 or above; 4 MB RAM; 1-8 MB free space on hard drive; color monitor; mouse; CD-ROM drive.

Source note: Gift of Optical Data School Media

Beginnings

Grades PreK–K

Delta Education, Inc.
PO Box 915
Hudson, NH 03051
Toll-free no.: (800) 258-1302
1 kit: Order no.: 03-703-0000
$565.00
Also see ordering note below.

Subjects: *Animals; Aquariums; Assessment; Counting; Data collection; Earth science; Energy; Integrated/ Interdisciplinary approaches; Interviews; Language arts; Life sciences; Mathematics; Measurement; Motion; Observation; Physical sciences; Process skills; Science skills; Science; Spatial ability; Terrariums.*

1992

Abstract: This unit, developed for grades preK and K, is part of a series of science modules produced by the third generation of the Science Curriculum Improvement Study (SCIS 3). SCIS 3 uses a thematic approach to science literacy that emphasizes depth of understanding and conceptual development. Each module in SCIS 3 focuses on the application of classroom science to the life of the learner, and each kit includes almost all of the necessary materials to carry out the investigations in the unit. In this unit, children observe and describe a variety of objects and organisms in the classroom and outdoors. Games, demonstrations, and other activities develop the children's ability to describe and compare objects based on their color, size, shape, texture, odor, and sound. Quantity and volume are introduced in simple activities such as counting beads and blocks and measuring quantities of water and marbles. Students are introduced to spatial relationships when they describe the position of objects and when they reproduce printed patterns using stickers. Changes that occur over time are emphasized in "Life on Land," where children build and maintain terrariums and work with land organisms. Children also maintain aquariums to learn about a variety of aquatic organisms. The teacher's guide provides background information, directions for advance preparation, an index of materials included in the kit, suggested teaching procedures, and extension activities. Each section concludes with review activities that also provide assessment opportunities. A glossary of terms is also provided. (Author/LCT)

Assessment note: The assessment component in this kit emphasizes frequent, informal assessments during regular classroom activities. Assessments include interviews and teacher observation of students as they carry out activities. Students are assessed on color and shape recognition, ability to describe textures and to describe and distinguish odors, observe and describe organisms, ability to describe sound and identify objects by sound, and understanding of size, quantity, and position.

Author: Authors, Herbert D. Thier and Robert C. Knott; production, Ann V. Richardson, Nancy P. Schoefl; science consultants, William W. Allen, Alan R. Berkowitz, Bonnie Brunckhorst, Mike Leonard, Valerie Pankow, Mike Reeske

Series: SCIS 3, Level K

Reference no.: ENC-006500

Ordering note: Terms governing use and reproduction: Blackline masters may be reproduced for student use. For permission to copy other parts of the kit, please write to Delta Education, Inc. Allow 4 weeks for delivery of living material. Shipment includes 2 freshwater crabs, 1 container duckweed, 6 elodea sprigs, 1 container fishfood, 3 goldfish, 2 newts, 6 pond snails, and 1 container tubifex worms.

1 teacher's guide: — Order no.: 03-403-0003 — ISBN 0-87504-930-3 — $39.50
1 refill kit: — Order no.: 03-703-0605 — $81.50
1 living material refill: — Order no.: 03-270-2556 — $46.20
1 sand and soil refill: — Order no.: 03-701-5205 — $6.40

Background: SCIS 3 is a major revision of the work of the Science Curriculum Improvement Study (SCIS), which was developed at the Physics Department and the Lawrence Hall of Science of the University of California at Berkeley with the support of the National Science Foundation (NSF).

Source note: Gift of Delta Education, Inc.

Chances Are: Hands-on Activities in Probability and Statistics, Grades 3–7

Grades 3–7

Teacher Ideas Press
PO Box 6633, Dept. ENCA
Englewood, CO 80155-6633
Telephone no.: (303) 770-1220
Toll-free no.: (800) 237-6124
Fax no.: (303) 220-8843
1 text: ISBN 1-56308-314-0 $22.00

Subjects: *Assessment; Chance; Hands-on learning; Journals; Manipulatives; Mathematics; Portfolios; Probability; Statistics.*

1995

Abstract: This text is intended for students and teachers in grades 3–7 and is designed to provide hands-on experiences in probability and statistics. This book incorporates recent educational research on curriculum, assessment, and instruction and reflects the National Council of Teachers of Mathematics (NCTM) Standards that pertain to probability and statistics. The curriculum and assessment components of this book have been field tested by classroom teachers and include pre-program and follow-up parent surveys. The activity section includes a teacher's guide, reproducible student activity handouts, reproducible cutout handouts of manipulatives, answer keys, and a glossary of probability and statistics terms. In one of the activities students use sandwich cutouts (lettuce, bacon, cheese, and bread) to determine the number of different sandwiches that can be made from the ingredients. Many activities provide opportunities for students to use calculators. (Author/DDD)

Assessment note: This book incorporates recent educational research on assessment. A student pre-program self-assessment is also provided with questions about attitudes in math. A student journal provides prompts for students, such as: "A new strategy I learned is...." and "To find the answer to the question I should...." This program is designed to be compatible with portfolio assessment.

Author: Sheila Dolgowich, Helen M. Lounsbury, Barry G. Muldoon

Reference no.: ENC-001798

Standards: NCTM Standards (1989). Content standards: Grades K–4. Statistics and probability; Grades 5–8. Probability.

Source note: Gift of Teacher Ideas Press

Change Over Time

Grade 5

Videodiscovery, Inc.
1700 Westlake Avenue N, Suite 600
Seattle, WA 98109-3012
Telephone no.: (206) 285-5400
Toll-free no.: (800) 548-3472
Fax no.: (206)285-9245
1 videodisc set: $300.00
Also see ordering note below.

Subjects: *Adaptations; Air pressure; Animals; Art; Assessment; Biology; Climate; Earth science; Ecology; Embedded assessment; Energy; Erosion; Evolution; Food webs; Fossils; Geology; Growth; Habitats; Insects; Integrated/Interdisciplinary approaches; Journals; Life sciences; Mutualism; Performance assessment; Physical sciences; Plants; Pollination; Portfolios; Predation; Problem solving; Process skills; Rocks; Science; Seasons; Soils; Solar energy; Temperature; Water cycle; Weather; Weathering; Wind.*

1994

Abstract: *Life Lab* is an interdisciplinary program of life, earth, and physical sciences in which students learn science concepts by building tools, testing ideas, and watching changes in the world around them. A class garden and hands-on activities form the core of the program, encouraging students to cooperatively investigate life cycles, weather, animals, habitats, and more. The unifying theme for this yearlong grade 5 curriculum is change over time. The year starts with students inferring simple changes in their own lives and in their garden. As students continue to explore changes, the concept of adaptation is introduced. The investigation of adaptations is an introduction to the underlying theme of evolution. By analyzing patterns of change, students are able to describe events and predict what may happen next. The grade 5 curriculum is divided into eight units that are separately packaged as modules to increase the flexibility of use. Each of the eight modules is divided into a teacher's resource section and a student's lab book section. The teacher's resource section includes a unit planner; a list of student goals; the words and score to an ecologically-oriented song; an activity chart; an annotated bibliography of story and reference books; a parent letter; blackline masters; and an assessment checklist. The resource section also includes the following for each activity: a key learning goal, background information, where the activity can be integrated into the curriculum, process skills used in the activity, a materials list, pre- and post-activity assessment strategies, extension ideas, and teacher reflection questions. The student lab book section includes lab handouts, unit calendars for students to use as a recording and observation tool, field log sheets, and background information and related stories. A separate teacher's guide describes the entire *Life Lab* program as well as the instructional and learning strategies that support the program. (Author/KSR)

Assessment note: The assessment component of this program includes journals, portfolios, and embedded performance assessments. The teacher's guide provides assessment checklists, pre- and post-activity assessment strategies, and laboratory sheets for students to diagnose their own learning. Students are evaluated based on their ability to explain a concept orally or in writing, demonstrate mastery of an idea or skill, formulate and refine a hypothesis, define and formulate problems, use science investigation skills to solve a problem, and work cooperatively.

Author: Developed by the Life Lab Science Program

Series: Life Lab Science, Grade 5

Reference no.: ENC-001468

Audience: Bilingual students; English as second language (ESL) students; Hispanic-American students

Language: English; Spanish

Ordering note: 1 videodisc set (includes 1 reference card, 1 teacher's resource book, 1 set of student lab books, 1 garden log calendar, 1 guess-test-tell poster, 1 garden know-how guide, 1 music tape) for Grade 5: $300.00. A companion videodisc and directory are available for $315.00.

Support: Teachers planning a larger garden can obtain training from the creators of Life Lab Science by contacting: Life Lab Science Program; 1156 High Street; Santa Cruz, CA 95064.

Funding: National Science Foundation

Source note: Gift of Videodiscovery, Inc.

13

Chemicals in Foods: Additives

Grades 7–10

Sargent-Welch Scientific Company
PO Box 5229
Buffalo Grove, IL 60089-5229
Toll-free no.: (800) 727-4368
Fax no.: (847) 459-6889
1 teacher's manual: Order no.: WL5266G-83; ISBN 0-201-29489-3
$19.99
Also see ordering note below.

Subjects: *Assessment; Biological sciences; Chemical properties; Chemicals; Chemistry; Extended response; Food additives; Food safety; Health; Life sciences; Multiple choice; Physical properties; Science; STS.*

1993

Abstract: This series of activity books, designed for use in middle or junior high schools, provides hands-on experiences focusing on chemicals and their interaction with people and the environment. Each book consists of an overview displaying the major concepts and activities covered in the book, several activities, tests to assess student learning (answers included), a glossary of terms, and directions for preparing reagents and solutions. This book examines chemical additives in foods. Throughout the activities, students investigate the effects of selected natural and synthetic substances on the rate of apple browning; examine food labels from home to determine additives in their own diets; explore chemical and physical properties of three common food additives; examine the effect of varying concentrations of sugar and other substances on the growth of yeast; use samples of rehydrated black-eyed peas in a simulated test for the presence of pesticide residues; consider health risks related to preparation and storage of various foods; and discuss how a decision to avoid certain foods due to perceived risks may lead to other risks. Background information, time and materials needed, procedure, suggested questions, discussion of results, and transparency and student activity sheets are provided for most activities. (Author/RA)

Assessment note: The assessment component in this series includes student activity sheets and a test item bank at the end of each CEPUP module. The test bank includes multiple choice, fill in, and extended answer items that address science content, processes, and societal issues listed in the conceptual overview of the module.

Author: Developed by the Chemical Education for Public Understanding Program (CEPUP), Lawrence Hall of Science, University of California, Berkeley

Series: Chemical Education for Public Understanding Program (CEPUP); Science Education for Public Understanding Program (SEPUP)

Publisher: Menlo Park, CA: Addison-Wesley Publishing Company

Reference no.: ENC-006433

Evaluation: Field tested at the following schools: Modules revised for field tests are tried by up to eighty teachers distributed among 15 to 18 sites in different states. Further information can be obtained from your local National Field Test Center, located in the following areas: Alaska; Chicago, IL; Colorado; Connecticut; Idaho; Iowa; Michigan; Mississippi; National Science Teachers Association; North Carolina; Ohio; San Diego, Vista, San Bernardino, Riverside, San Francisco Bay Area, CA; Western New York.

Ordering note: Kits may also be purchased containing the materials used in the experiments. Kit no. WL5266G-82, to accompany this unit, is $239.99. More disposable trays, necessary for the experiments, can be ordered: No. WL5266G-56 $43.59 for 16 trays.

Funding: National Science Foundation (NSF)

Background: Chemical Education for Public Understanding Program (CEPUP), headquartered at the Lawrence Hall of Science, University of California at Berkeley, is funded by various private industry grants and a grant from the National Science Foundation. Program name has changed to Science Education for Public Understanding Program (SEPUP).

Source note: Gift of Sargent-Welch Scientific Company

DASH: Grade 2

Grade 2

Developmental Approaches in Science and Health Project
1776 University Avenue
Honolulu, HI 96822
Telephone no.: (808) 956-7863
Toll-free no.: (800) 799-8111
Fax no.: (808) 956-4973
1 text: $375.00
Also see ordering note below.

Subjects: *Animals; Assessment; Behavior; Calendars; Communication skills; Communications; Concept maps; Conservation; Construction; Earth science; Energy; Environment; Fishes; Food; Health; Growth; Insects; Life sciences; Matter; Moon; Nutrition; Physical sciences; Plants; Portfolios; Process skills; Recycling; Roots; Safety; Science; Seasons; Simple machines; Soils; Space sciences; Spiders; Sun; Technology; Time; Transportation; Volume; Weather.*

1990

Abstract: *Developmental Approaches in Science and Health* (*DASH*) is a sequential K–6 program that integrates the contents of science, health, and technology. In *DASH*, children discover the workings of science through practical, hands-on experiences that are designed to promote children's mental and physical development. The curriculum is constructivist based, uses concept maps extensively, involves students in self evaluation, advocates that teachers use portfolio-based judgment of student progress, builds on cooperative learning, and has a strong environmental component. The curricula for all grades have the same ten strands that include learning in general; time, weather, and the sky; animals; plants; food and nutrition; health and safety; navigation and transportation; energy and communication; conservation, recycling, and decomposition; and matter, space, and construction. The teacher's guide provides from 4 to 21 activities per strand, each building on the activities from the previous year and appropriate for each specific grade level. Each activity includes the objectives, background information, the role students should play, a materials list, student products, the procedures, and possible extensions. A second manual includes the student handouts for the activities, a grade 2 suggested yearlong activity schedule, a scope and sequence of activities for the entire *DASH* program, and a comprehensive materials list for the grade 2 program. An instructional guide is available for the entire program. (Author/KSR)

Assessment note: The assessment component in this program includes portfolios, concept maps, and self-evaluation. Teachers observe students as they carry out the activities and rate their mastery using a concept and skills inventory. After both teacher and student have completed their ratings, discrepancies in ratings can be resolved by discussion with the student.

Author: Principal authors, Francis M. Pottenger III, Carol Ann Brennan, Karen N. Yamamoto

Series: DASH (Developmental Approaches in Science and Health)

Reference no.: ENC-001231

Ordering note: These materials are also available through teacher training institutes held throughout the country every year. The price of the institute with the materials is $675.00.

Funding: Hawaii, Department of Business and Economic Development; National Science Foundation (NSF); University of Hawaii, Curriculum Research and Development Group

Source note: Gift of Curriculum Research and Development Group of the University of Hawaii

Habitats

Grade 3

ScottForesman
1900 East Lake Avenue
Glenview, IL 60025
Toll-free no.: (800) 554-4411
Fax no.: (800) 841-8939
1 module kit: ISBN 0-673-40329-7 $74.36
1 student text: ISBN 0-673-35854-2 $5.25
1 teacher resource package:
ISBN 0-673-35996-4 $238.06
Also see ordering note below.

Subjects: *Adaptations; Assessment; Concept maps; Deserts; Earth science; Ecology; Environment; Extended response; Growth; Habitats; Life sciences; Multiple choice; Performance assessment; Physical sciences; Plants; Portfolios; Problem solving; Process skills; Rubrics; Science; Temperature.*

1996

Abstract: *Discover the Wonder* is a hands-on, thematic science program, developed for grades K–6, offering from four to six modules per grade. Each module offers active, hands-on experiences while using open-ended questions so students may explore, explain, and solve problems to gain relevance and understanding of life, earth, and physical science concepts that explain the world. This module, developed for grade 3, contains lessons about deserts. Activities include experiments to find how fast various soils dry, to grow plants in desert conditions, and to study how cactus are adapted to desert life. In the performance assessment, students test for the effects of color on the temperature of an organism. Each module includes a student's and a teacher's edition of the text, the *Explorer's Activity Guide*, and the science study sheets as well as the *Teacher's Assessment Package*, activity booklet, transparencies, and Science Library teacher's guide. Accessory items include equipment kits, the *Exploracenter* (mini museum including 30 activities per grade), videodiscs or videotapes (introduces a module via video field trips), CD-ROM software (provides maps, charts, graphics, information screens, and QuickTime movies), trade books and literature selections, and an online opportunity to design and race with the *America's Cup* team. A rubric listing the module's concepts, activities, assessment opportunities, and lesson plans is contained in the teacher's edition of the text. The *Explorer's Activity Guide* contains activities for home projects and data collection opportunities. Traditional, performance, and portfolio assessment strategies are found in the *Teacher's Assessment Package*. Other modules in this series, including a Spanish version, include *Gardening*, *Finding Shelter*, *Moving*, *Sounds All Around*, and *Protecting the Earth*. (Author/DEB)

Assessment note: The assessment component of this kit includes traditional, performance, and portfolio assessment strategies. The *Teacher's Assessment Package* provides guidelines on how to maintain and evaluate porfolios, concept maps, information about setting up and administering the performance assessments, and rubrics for portfolios and general activities. A coaching rubric that can be completed by self, peer, and teacher is also provided. The traditional assessments consist of multiple choice, matching, and extended answer items.

Author: ScottForesman; series consulting author, David Heil; consulting authors, Maureen Allen, Timothy Cooney, Angie L. Matamoros, Manuel Perry, Irwin Slesnik

Series: *Discover the Wonder*. Grade 3, Module A

Language: English; Spanish

Reference no.: ENC-004008

Ordering note: Please contact publisher for full catalog and current pricing.
1 module kit includes a teacher's guide and the items needed to do the hand-on activities in the student text.
1 teacher resource package includes the *Explorer's Activity Guide* Teacher's Edition, the English Key concept book, the *Teacher's Assessment Package*, the Interactive transparencies, and the Science study sheets. Key concept books are also available in Spanish, Vietnamese, Chinese, Cambodian, Philipino, and Haitian Creole.

Also available: videodisc package: $146.29; interactive software: $146.95; video readers to support videodisc activities: $3.38; videotape package of videodisc sequences: $83.95; literature library: $90.48;
1 *Teacher's Assessment Package:* $71.34

Source note: Gift of ScottForesman, a division of HarperCollins Publishers

The Hole in the Sky

Grades 5–8

Tom Snyder Productions, Inc.
80 Coolidge Hill Road
Watertown, MA 02172-2817
Toll-free no.: (800) 342-0236
Fax no.: (617) 926-6222
1 kit with TimeLiner software:
No.: SIAHOL-J $399.95
1 kit w/out TimeLiner software:
No.: SIAHOW-J $349.95
Also see ordering note below.

Subjects: *Art; Assessment; Atmosphere; Chemicals; Chemistry; Earth science; Environment; Environmental awareness; Environmental impact; History; Integrated/ Interdisciplinary approaches; Ozone depletion; Ozone; Performance assessment; Portfolios; Role playing; Rubrics; Science; STS; Ultraviolet radiation.*

1994

Abstract: This kit was developed for middle school students based on the concepts and content of *Science in American Life*, a major exhibition at the National Museum of American History. The central theme of the kit is the hole in the Earth's ozone layer. The kit contains six modules, and each module focuses on interdisciplinary instruction, cooperative learning, and performance-based assessment. In the first module, students play three different versions of a historical board game that requires analysis of primary source documents about the history of refrigeration. Throughout the games, students build timelines from the historical and scientific information they gather and learn about the history behind the current ozone problem. In the second module, students complete three hands-on science experiments exploring how various materials and sunscreens affect UV radiation from the sun. Students use sun-sensitive paper to compare the effectiveness of different types of clothing, lenses, and sunscreens in providing protection against the harmful rays of sun. The third module consists of a classroom play that physically portrays what happens to molecules in the upper atmosphere and ozone layer. The play combines drama, comedy, and music and provides students with a concrete sense of how the ozone layer is endangered. By analyzing conflicting newspaper articles, students in the fourth module explore the different perspectives on the ozone issue. Then in the fifth module, students take on the roles of legislators, scientific experts, and representatives of special interests, and act out a debate in a mock Congressional hearing. In the last module, students write and publish a newspaper filled with facts, opinions, and ideas relating to the ozone issue. The kit also contains student portfolios which provide background information for each module, instructions, and worksheets and activities for students to complete. A teacher's guide is included in each module and consists of a section with theoretical ideas and practical tips on interdisciplinary instruction, cooperative learning, and performance based assessment; detailed lesson description, background information, and model standards and evaluation strategies for each module; suggestions on how to connect each module with the others; and a list of references and resources. (Author/RA)

Assessment note: The assessment component of this kit includes performance-based assessments and student portfolios. For example, students demonstrate their understanding of the chemical processes that create and destroy the ozone layer through role playing, drawing, and completing worksheets in their portfolios. The teacher's guide provides a structure for alternative assessments and guidelines for rubrics, and indicates opportunities for ongoing assessment. Student portfolios include experiments, guidelines for recording and interpreting data, brief articles, and outlines for article analyses.

Author: Developed by the National Museum of American History, Smithsonian Institution

Series: *Science in American Life*

Reference no.: ENC-003708

Evaluation: Field tested at the following schools: Gaskill Middle School, Niagara Falls, NY; Glascow Intermediate School, Fairfax County, VA; Bunker Hill Elementary, Washington, DC; Slowe Elementary, Washington, DC.

Equipment: System requirements: Macintosh: At least 1 MB RAM available; 3.5 inch floppy disk drive. Apple II: At least 64K RAM; 5.25 or 3.5 inch floppy disk drive. MS-DOS: At least 256K RAM available; 5.25 or 3.5 inch floppy disk drive. Network versions: AppleShare or Novell based.

Ordering note: Mention special source code e-focus and receive a free copy of *Cooperative Learning & Technology*.

Source note: Gift of Tom Snyder Productions, Inc.

Ice Cream Making and Cake Baking

Grades 5–8

Cuisenaire Co. of America
PO Box 5026
White Plains, NY 10602-5026
Telephone no.: (914) 997-2600
Toll-free no.: (800) 237-3142
Fax no.: (914) 997-2192
1 text: Order no.: EN501-084680;
ISBN 0-938587-36-6 $12.50

Subjects: *Assessment; Chemistry; Conduction; Convection; Data analysis; Data collection; Earth science; General science; Heat; Physical sciences; Performance assessment; Radiation; Science.*

1994

Abstract: This activity guide, part of a series developed for grades 5–8, uses making ice cream and baking cakes to explain the phenomenon of heat transfer. The activities illustrate the three basic types of heat transfer: conduction, convection, and radiation. In most of the activities students try to determine the best conditions for removing heat from a container. Preventing heat transfer is investigated in the cardboard box oven demonstrations; because of cost and safety factors, these are teacher-led demonstrations. One activity has students determine whether ice cubes melt faster in paper, plastic, glass, or metal containers; another activity involves cooling hot water with ice and salt. A cardboard box oven is constructed; the last activities in the guide involve using the knowledge gained from the previous activities to make ice cream and bake a cake. Each activity provides a teacher section and a student section. The teacher section includes background and rationale, time requirements, material lists, plans for leading the activity and the discussion, and suggestions for further investigations. Specific suggestions are given for evaluating student involvement and learning in each of the activities. The student section is reproducible and contains numbered instructions and diagrams for the procedure, tips, and a list of questions. A table is provided so that students can collect data and record their observations. This data is shared with the class and used as the basis for class discussions. (Author/FEB)

Assessment note: The assessment component of this series includes embedded performance assessments such as observing students' nonverbal behavior, participation in discussions, and writing and record keeping. The teacher's guide provides specific suggestions for judging student involvement and learning for each of the activities.

Author: Bernie Zubrowski

Series: *Middle School Science Curriculum Topics Development, Models in Physical Science*

Reference no.: ENC-006470

Evaluation: Citation: [Review]. *NSTA Reports*. "Science teacher's grab bag. Materials & more," p. 25 (April 1994).

Field tested at the following schools: Curley Middle School, McCormack Middle School, Thompson Middle School (Boston, MA); Morse Middle School (Cambridge, MA); Lincoln School (Brookline, MA).

Funding: National Science Foundation (NSF)

Background: Original project title is Middle School Science Curriculum Topics Development

Source note: Gift of Cuisenaire Company of America, Inc.

Related resources: Other titles in this series include *Tops and Yo-yos*, *Structures*, and *Inks, Food Colors, and Papers*,

Tops and Yo-yos, developed for grades 5–8, introduces students to the basic physical phenomenon of rotational motion by using tops and yo-yos. The variety and order of the activities within the guide exemplify the scientific method: a set of activities using tops is compared with a set of activities using yo-yos. The set of activities can be divided into three sections. The first section has students examine how tops move; students then apply the knowledge gained from the tops to the yo-yos; in the third section, students reexamine tops, taking a more quantitative and conceptual approach.

If Shipwrecks Could Talk

Grades 6–8

Delta Education, Inc.
PO Box 3000
Nashua, NH 03061-3000
Toll-free no.: (800) 442-5444
Fax no.: (800) 282-9560
1 kit: Order no.: 55-738-4695
$355.00

Subjects: *Archaeology; Assessment; Boats; Buoyancy; Cooperative learning; Earth science; Extended response; History; Integrated/Interdisciplinary approaches; Map skills; Maps; Navigation; Oceans; Performance assessment; Physical sciences; Process skills; Science; Technology.*

1995

Abstract: This kit, developed for grades 6–8, is part of a series of *Delta Science Modules* that provide cross-curricular activities that integrate the sciences. Each module emphasizes basic science concepts and science content while developing students' process skills and increasing their appreciation for both the natural world and technology. This kit contains eleven hands-on activities that help students learn where mariners sailed, the methods and tools they used to navigate, and common causes of shipwrecks. They also investigate how archeologists discover, map, interpret, and preserve shipwrecks as precious artifacts of the past. Sample activities include using maps to discover how much of the Earth is covered by water, designing model cargo ships, examining contemporary artifacts, and investigating the effects of water pressure. The teacher's guide provides background information, directions for advance preparation, an index of materials included in the kit, reproducible student worksheets, assessment strategies, extensions, and connections to additional disciplines. The kit also includes a videotape about the history and excavation of the seventeenth century shipwreck *Atocha*. (Author/LCT)

Assessment note: The assessment component of this kit includes student activity sheets and a comprehensive performance-based assessment activity. The activity consists of three sections and is designed to assess each student's ability to work with materials, and to apply the major concepts and content introduced in the module. The first assessment is a hands-on activity that has children make predictions about and test the buoyancy of different designs of boats. A second activity assesses map skills by asking students to label maps and interpret data (in the form of artifacts) from a shipwreck. The third activity consists of extended answer questions. An assessment checklist is included.

Author: Author, R. Duncan Mathewson, III; editing, Bob Roth; design and production, Ann V. Richardson; illustration and art production, Nancy P. Schoefl

Series: *Delta Science Modules* 2

Reference no.: ENC-006548

Source note: Gift of Delta Education, Inc.

Related resources: There are several kits in this *Delta Science Modules* series, some designed for elementary grades as well.

Looking at Liquids (Order no.: 55-738-4299 $310.00)
This kit, developed for grades 3–5, is part of a series of *Delta Science Modules* that provides cross-curricular activities that integrate science. Each module emphasizes basic science concepts and content while developing students' process skills and increasing their appreciation for both the natural world and technology. This kit contains twelve hands-on activities that introduce students to some properties of liquids such as cohesion, surface tension, adhesion, and density. Physical states of water and pH are also explored.

DNA - from Genes to Proteins (Order no.: 55-738-4684 $320.00)
This kit for grades 6–8 contains thirteen hands-on activities that help students trace what they observe from their own features to their cells, then to the microscopic DNA within the cells. In the activities, students create three-dimensional models of cells and organelles using plastic spheres, cellophane, buttons, and macaroni. Strands of yarn are used to represent the double helix structure of DNA. More advanced activities introduce students to cloning and DNA fingerprinting.

In the Air

Grades 6–8

Addison-Wesley Publishing Company, Inc.
200 Middlefield Road
Menlo Park, CA 94025
Toll-free no.: (800) 447-2226
Fax no.: (800) 367-7198
1 text: Order no.:
KF 0-201-49311-X $24.94

Subjects: *Aeronautics; Angles; Assessment; Career awareness; Careers; Data analysis; Data collection; Data interpretation; Distance; Embedded assessment; Estimation; Extended response; Geometry; Integrated/Interdisciplinary approaches; Maps; Mathematics; Measurement; Navigation; Orienteering; Physical sciences; Prealgebra; Real world applications; Scale drawings; Science; Statistics.*

1994

Abstract: This series of integrated math and science resource books, developed for grades 6–8, provides modules that incorporate prealgebra skills into hands-on science explorations. Each module focuses on a different topic, but each includes information about careers in math, science, and engineering; activities that connect math, science, and language arts; information that can be used to integrate history with math or science; creative project ideas for students to complete with their families; and many types of assessment that focus on both attitude and competence. In this module, students explore aspects of the career of a visual flight pilot; work in cooperative groups, learn about statistics, measurement, equations, and geometry; learn how to use a magnetic compass and give and interpret directions; and as a culminating activity, work in groups to chart a cross-country journey in a Cessna 172. Activities include using a city map to explore navigation; using a circular protractor to interpret as well as to draw angles representing compass headings for several courses; drawing course lines between starting points and destinations; determining directions and calculating distances based on the mileage scale; and developing a formula and preparing a detailed flight plan. Each activity begins with an overview that summarizes what students will do, how the teacher needs to prepare, and how the teacher could present the activity. Each activity includes the purpose, a materials list, discussion questions, assessment questions, and student sheets. The activities are based on current reform philosophies recommended by the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989) and the American Association for the Advancement of Science (AAAS) Project 2061. (Author/VN/KSR)

Assessment note: The assessment component in this book includes embedded performance assessments, worksheets, group activities, and discussion questions. Worksheet items include data tables, measurements, calculations, and short and extended answer questions. Examples of specific assessments have students work in pairs to create a flight plan for a Cessna 172 and use a compass rose to determine direction.

Author: Christine V. Johnson; developed by Washington MESA (Mathematics, Engineering, Science Achievement)

Series: *MESA* series; *Real-world Mathematics Through Science*

Reference no.: ENC-001971

Standards: NCTM Standards (1989). Content standards: Grades 5–8. Mathematics as problem solving; Mathematics as communications; Mathematics as reasoning; Mathematical connections; Number sense and number relationships; Computation and estimation; Patterns and functions; Algebra; Statistics; Geometry; Measurement.

NCTM Standards (1989). Evaluation standards: General assessment: Alignment; Multiple sources of information; Appropriate assessment methods and uses. Student assessment: Mathematical power.

NCTM Standards (1989). Professional standards: Standards for teaching mathematics. Worthwhile mathematical tasks; Teacher's role in discourse; Tools for enhancing discourse; Learning environment.

Project 2061 (1985)

Funding: National Science Foundation (NSF)

Source note: Gift of Addison-Wesley Publishing Company, Inc.

Insights & Outcomes:

Grades K–10

Assessments for Great Explorations in Math and Science

University of California, Berkeley
GEMS
Lawrence Hall of Science, #5200
Berkeley, CA 94720-5200
Telephone no.: (510) 642-7771
Fax no.: (510) 643-0309
1 text: ISBN 0-912511-90-7 $25.00

Subjects: *Assessment; Embedded assessment; Mathematics; Pedagogy; Performance assessment; Professional development; Science; Teaching methods.*

1995

Abstract: This teacher handbook, developed at the University of California Berkeley's Lawrence Hall of Science for the *Great Explorations in Mathematics and Science* (*GEMS*) program, provides a source of ready-made assessments as well as inspiration and support for the creation of new outcomes and assessments for K–10 activity-based science and mathematics programs. These assessment task models have been created with the goal of measuring the development of thinking skills; meaningful construction and application of concepts; and the ability to pursue questions, solve problems, and communicate. The book includes a guide to effective assessment, ready-made assessment tasks, thirteen different assessment strategies, and a section detailing learning outcomes for each of the current *GEMS* teacher's guides. Among the different assessment strategies are explorations in which students demonstrate skill development; applications that require students to use their recently acquired concepts and skills in new or real-life situations; advertisements in which students pull together facts and ideas to communicate, evaluate and compare; and time-efficient strategies for teacher observations. (Author/GMM)

Author: Jacqueline Barber, Lincoln Bergman, Jan M. Goodman, Kimi Hosoume, Linda Lipner, Cary Sneider, and Laura Tucker

Series: *GEMS*

Reference no.: ENC-006463

Support: *GEMS* Leader's workshops (supported through a National Science Foundation grant) are held across the country each year. For more information, contact the publisher.

Source note: Gift of *GEMS* Program, Lawrence Hall of Science, University of California, Berkeley

Related resources: The *GEMS* series offers teacher's guides for several different topics in math and science, sometimes integrating those subjects with other curriculum areas.

Of Cabbages and Chemistry (1 text: ISBN 0-912511-63-X $10.00)
Activities and games in this book, developed for grades 4–8, integrate literature, science, and math, and are intended to develop such skills as observation, comparing, recording results, and drawing conclusions. Students explore acids and bases using the special indicator properties of red cabbage juice. A color change game helps students discover the acid-base pH scale.

In All Probability: Investigations in Probability and Statistics (1 text: ISBN 0-912511-83-4 $12.50)
Activities and games in this book, developed for grades 3–6, integrate literature, science, and writing with math, and are intended to develop such skills as observation, prediction, classification, estimation, and recording data. Each of the five activities in this book involves collecting, organizing, and interpreting data, usually by recording on a data sheet and then making a graph. A sampling of activities includes students playing a game with two different spinners (one fair and one unfair) and comparing the results; and using sticks they make themselves to play a version of a Native American game of chance.

To Build a House: GEMS and the Thematic Approach to Teaching Science (1 text: ISBN 0-912511-77-X $8.50)
This *GEMS* handbook for teachers uses practical examples to help clarify and explore the benefits of a thematic approach to teaching science. It provides background to topics of current educational debate. The ten major themes for the teacher's guides are presented and defined. A presentation on how science should be taught along with masters for overhead transparencies are provided.

Integrating Environmental Education and Science: Using and Developing Learning Episodes

Grades K–12

ERIC Clearinghouse for Science, Mathematics, and Environmental Education
1929 Kenny Road
Columbus, OH 43210-1080
Telephone no.: (614) 292-6717
Toll-free no.: (800) 276-0462
Fax no.: (614) 292-0263
1 text: $7.90 (Ohio) or $14.95 (Outside Ohio)

Subjects: *Animals; Assessment; Birds; Concept maps; Conservation; Curriculum; Curriculum design; Environment; Erosion; Habitats; Journals; Land use; Outdoor activities; Portfolios; Process skills; Professional development; Reform; Rubrics; Science; Science education.*

1994

Abstract: This instructional guide with activities, developed for curriculum writers and teachers, is designed to encourage environmental literacy and responsible environmental behavior through the implementation of the Ohio Competency-Based Science Program and to assist curriculum developers in designing curricula by providing sample learning episodes. Learning episodes are descriptions of an experience that capture the multifaceted aspects of teaching and the conditions necessary for effective learning to take place. Components of the learning episodes include the title, an overview, grade level range, an illustrative instructional objective (based on the Ohio Model Science Program), background, procedure, assessment, materials, and references. A sampling of topics includes observing birds to investigate patterns in nature, implementing solutions to an environmental problem by convening an environmental congress, exploring habitat needs, managing soil erosion, discussing and resolving land use issues, and formulating concept maps that show how human scenarios change due to earth changes. General guidelines are given to enable others to develop their own learning episodes. The document discusses the goals of environmental and science education and identifies key elements that make up the content of curricula and suggests a range of ways to organize them. Appendices include an outline of the science model, curricular and professional resources, ninth-grade proficiency outcomes, and blank models and webs. (Author/DEB)

Assessment note: The assessment component in this book includes lists, samples, and tips that compare and contrast traditional and authentic assessments. Sample assessments include student journals, portfolios, self-evaluation, long-term projects, overall participation in groups, concept maps, and rubrics.

Author: Edited by Diane C. Cantrell, Patricia A. Barron; developed by Environmental Educational Council of Ohio, Science Education Council of Ohio, Ohio Department of Natural Resources, Ohio Department of Education, Science and Mathematics Network of Central Ohio, American Electric Power and Columbus Southern Power/Ohio Power, The John T. Huston—Dr. John D. Brumbaugh Nature Center of Mount Union College.

Reference no.: ENC-001682

Standards: National Science Education Standards (Draft, November 1994) National Research Council

Ohio Model Competency-based Science Program (1994)

Project 2061 (1985)

Scope, Sequence and Coordination (SS&C). National Science Teachers Association

Funding: Ohio Environmental Protection Agency, Ohio Environmental Education Fund

Source note: Gift of Environmental Education Council of Ohio

Integrating Mathematics, Science and Language: An Instructional Program, Volume 1

Grades K–1

Southwest Educational Development Laboratory
211 E. 7th Street
Austin, TX 78701
Telephone no.: (512) 476-6861, ext. 259
Fax no.: (512) 476-2286
Each volume: $25.00, plus 15% for shipping.

Subjects: *Arithmetic; Assessment; Biological sciences; Dinosaurs; Fossils; Growth; Health; Human body; Insects; Integrated/Interdisciplinary approaches; Language; Language arts; Life sciences; Mathematics; Number sense/theory; Nutrition; Performance assessment; Plants; Pollination; Science; Seeds; Senses; Spiders.*

1993

Abstract: This instructional program, developed for grades K–3, is a two-volume curriculum and resource guide designed to increase achievement of Hispanic primary grade children whose first language is not English. The guides offer a curriculum plan, instructional strategies and activities, teacher and student materials, and assessment procedures. Motivational strategies and materials compatible with the students' own social and cultural environments are incorporated into the instructional materials to develop and enhance positive attitudes and values toward mathematics, science, and language learning. Volume 1, developed for kindergarten and grade 1, covers the following units: the senses, spiders, dinosaurs, plants and seeds, the human body, and good health. Preceding each unit is a Spanish version of background information as well as a Spanish version of the formal introductory portion of the lesson cycle. Presented first in the unit overview is a recommended list of content or skills students should have as prior knowledge before doing the unit activities. Next specific mathematics, science, and language objectives are listed followed by a topic concept web that shows relationships among the various science content elements presented in the unit. The web prompts the identification of two major ideas (Big Ideas), one in science and one in mathematics, that the class will develop in each lesson. A list of key vocabulary items in both English and Spanish, teacher background information, and the lesson focus that lists each of the Big Ideas presented in the lessons are provided. Each Big Idea is stated as an overarching concept in science or mathematics that generates the lesson activities. Following the lesson focus is an objectives grid displaying the unit objectives by content area and by lesson activity. (Author/VN)

Assessment note: Assessment of student achievement is expected to be ongoing on an informal basis throughout each lesson through teacher observation of the students' interactions and behaviors. Assessment strategies are provided in the final phase of each lesson or unit to assist teachers in determining the extent to which the students have grasped the Big Ideas presented in a given lesson and or unit. The strategies may include oral, performance, and written assessments. For example the suggested closing assessments in the "Hearing" lesson in "Unit K the Five Senses" include: an oral assessment in which the whole class or individuals are asked questions such as "What part of the body do you use to hear?" and "Could you communicate if you couldn't hear? How?" Other examples are a performance assessment task in which students sort pictures of objects by whether they can be heard or not and a written assessment in which students are asked to place labels of ear parts on a diagram of the ear.

Author: Developed through SEDL Paso Partners Project

Series: *Integrating Mathematics, Science and Language*, Volume 1

Reference no.: ENC-001679

Audience: English as second language (ESL) students; Hispanic-American students; Limited English Proficiency (LEP) students and teachers

Language: English; Spanish

Funding: United States Department of Education, Office of Educational Research and Improvement (OERI)

Source note: Gift of Southwest Educational Development Laboratory (SEDL)

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Lessons in Mathematics for the Classroom and for Inservice Sessions with Alternative Assessment Procedures

Grades 5–12

Leadership Development Project, University of Northern Iowa, Department of Mathematics
Cedar Falls, IA 50614-0506
Telephone no.: (319) 273-6952
Fax no.: (319) 273-2546
1 text: Order no.: EA $15.00
Also see ordering note below.

Subjects: *Assessment; Data analysis; Data collection; Functions; Geometry; Graphing; Mathematical models; Mathematics; Models; Probability; Problem solving; Professional development; Rubrics; Slope; Tessellations; Transformations.*

1994

Abstract: These lessons present teacher-ready materials for mathematics instruction which are designed to be in alignment with the vision presented in the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989). Each lesson includes objectives, teacher's guides (including required prerequisite knowledge), a list of needed materials, worksheets, and transparency masters. Many of the lessons are activity based or involve open-ended problems, and the use of technology (such as graphing calculators) is suggested for several of the lessons. Topics covered include the concept of slope, mathematical modeling, iteration and recursion relations, probability, geometry and geometric transformations, linear algebra, the concept of function, tessellations, graphs, and data analysis. These lessons are also designed to be used by inservice leaders and teacher educators, and an outline for an inservice session (including objectives, materials, and time requirements) has been included with each lesson. These materials were developed by a group of experienced classroom teachers and Presidential awardees during the three-year *Leadership Development and Enabling Change Project* which was funded by the National Science Foundation and supported by the University of Northern Iowa. (Author/DDD)

Assessment note: Traditional assessment methods may not be sufficient for evaluating whether some of the objectives of these lessons (such as the ability to discover multiple solutions, use technology effectively, communicate mathematically, collaborate in problem solving, discover patterns, and conjecture) have been attained; therefore, alternative assessment methods are suggested for each lesson. A variety of assessment methods are employed, each appropriate for the objectives of that particular lesson. Some of the methods included are realistic application problems, writing tasks, behavior observation, and holistic scoring rubrics.

Author: *Leadership Development and Enabling Change Project*, University of Northern Iowa

Reference no.: ENC-002599

Standards: NCTM Standards (1991)

NCTM Standards (1989)

Ordering note: E-mail inquiries to: mary.friedrich@uni.edu; orders by mail or fax only.

Funding: National Science Foundation, Council of Presidential Awardees in Mathematics

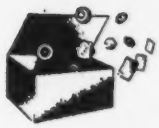
Source note: Gift of the Leadership Development Project (LDEC), University of Northern Iowa

Liquids

Grades 2–3

Optical Data School Media
512 Means Street, NW, Suite 100
Atlanta, GA 30318
Telephone no.: (404) 221-4500
Toll-free no.: (800) 524-2481
Fax no.: (404) 221-4520
1 teacher's guide: Order no.: 2-172-2;
ISBN 0-89292-102-1 $70.00
1 kit (teacher's guide and materials kit):
Order no.: 703-8 $495.00

Subjects: *Assessment; Buoyancy; Chemistry; Cohesion; Density; Liquids; Performance assessment; Physical sciences; Physics; Process skills; Science; Viscosity; Water.*



1994

Abstract: *Insights* is a hands-on inquiry science curriculum consisting of a series of modules designed to provide elementary students with science experiences that will help them learn science skills and concepts and to provide teachers with the guidance and background they need to teach science in the spirit of scientific exploration and discovery. The series encourages students to develop thinking and process skills by observing; comparing; classifying; questioning; trial and error; and discussing, analyzing, and communicating their thoughts and discoveries with their classmates. In each module, students use different materials to investigate phenomena and explore a scientific theme in depth. This module (grades 2–3) contains 12 learning experiences that cover roughly 20 sessions (45 minutes each) in which students explore three liquids (water, oil, and corn syrup) and determine how these liquids behave in isolation, how they compare, and how they interact when mixed. The major organizing themes are cause and effect and structure and function. The module begins with a formal assessment activity that helps the teacher determine the knowledge and conceptions students have about liquids. Learning experiences involve students in the following activities: making a web of their knowledge and experiences with water; describing water, oil, and corn syrup; exploring the properties of water, oil, and corn syrup and how they interact; and applying the concepts and skills they have learned in designing and building a boat, toy, or game. The learning experiences conclude with a final performance assessment of the children's conceptual growth and development over the course of the module. Every learning experience includes all or some combination of the following four phases: getting started, exploring and discovery, processing for meaning, and extending ideas. This module includes reproducible masters for science notebook pages, teaching suggestions, a teaching learning framework, a science thinking and process skills framework, an assessment framework, organization of each learning experience, a summary of the materials needed, and teacher resources including books and audiovisual materials. (TDB)

Assessment note: The assessment component of this curriculum includes a written pretest, daily assessment checklists, performance assessments, and a final questionnaire. The final assessment is intended to measure change and growth, and contains open-ended questions designed to assess children's conceptual knowledge.

Author: Education Development Center, Inc.

Series: *Insights Elementary Science Curriculum*

Reference no.: ENC-000871

Publisher: Newton, MA: Education Development Center, Inc.

Evaluation: Field tested in the following schools: Cleveland Public Schools, Cleveland, OH; San Francisco Unified School District, San Francisco, CA; Los Angeles Unified School District, Los Angeles, CA; City of Baltimore Public Schools, Baltimore, MD; Montgomery County Schools, MD; Boston Public Schools, Boston, MA.

Funding: National Science Foundation (NSF)

Source note: Gift of Optical Data School Media

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Math Assessment: Grades 5 to 6

Grades 5–6

Teacher Created Materials, Inc.
PO Box 1040, Dept. DENC
Huntington Beach, CA 92647
Toll-free no.: (800) 662-4321
Fax no.: (800) 525-1254
1 text: Order no.: TCM778-DENC
$11.95
1 series: Order no.: TCM1039-DENC
(14 volumes) $183.30

Subjects: *Addition; Arithmetic; Assessment; Computation; Coordinates; Decimals; Division; Extended response; Fractions; Geoboards; Geometry; Mathematics; Measurement; Multiplication; Number sense; Numeration; Observation; Patterns; Professional development; Rubrics; Subtraction; Time; Whole numbers.*

1994

Abstract: This book from the *Math Assessment* series is designed for use by teachers of grades 5–6. Each book in the series is a collection of alternative assessment tools that are intended to focus on students' thinking and the demonstration of that thinking. The authors desire that the books be used as a companion with the formal assessments used by schools and districts, but also as a sampling of what can be easily extended, enriched, and reproduced by classroom teachers. A key principle of each book is that the way instruction is delivered and the way knowledge is tested are closely aligned. In order to allow for a more authentic assessment of processes, they suggest that teachers first expose students to the format and the language used to complete these activities before proceeding with a small group approach which provides teachers with the up close observations and listening opportunities necessary to capture students' understanding. Each book includes observable behavior assessments, enhanced multiple choice assessments, assessment rubrics, and resource pages, and blackline masters. Assessments are correlated with standards from the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989). Each of ten observable behavior assessment activities, designed for use with small groups of students, provides a complete method page, a formatted teacher data collection tool (Teacher Data Capture Sheet), and a student page for recording responses (Student Data Capture Sheet) which are designed to allow teachers to document their observations of students' development. The enhanced multiple choice assessments address students' understanding of arithmetic operations and number sense. They are intended to provide a bridge from dependence on manipulatives to routine use of mathematics as symbols. Problems are stated in such a way that multiple solutions and solution strategies are possible. For example, an addition problem at stage one difficulty level asks students to choose two numbers from a list (one to six) to form a problem with the sum of nine. A stage two problem presents a list of digits and asks the student to place the digits to form a problem having a solution between two stated numbers. Higher level stages differ according to content and grade level, but often require more sophisticated strategies on the part of the student. In this book, this format is used with all four operations to practice and reinforce number, number sense, and whole number, decimal, and fraction computation while at the same time requiring the application of communication, reasoning, estimation, patterns, and relationships. Example scoring rubrics for the enhanced multiple choice problems within the book are provided to help teachers categorize students' responses and thus identify students' level of understanding of operations and solution strategies. Scoring rubric models and explanations are also provided as guides for teachers to use in developing their own alternative assessments. (Author/GMM)

Author: Written by Layne T. Vinton; editor, Karen J. Goldfluss

Series: *Assessment Series*

Reference no.: ENC-007295

Standards: NCTM Standards (1989)

Source note: Gift of Teacher Created Materials, Inc.

Microworlds

Grade 5

Carolina Biological Supply Company
2700 York Road
Burlington, NC 27215
Telephone no.: (910) 584-0381
Toll-free no.: (800) 334-5551
Fax no.: (800) 222-7112
1 student activity book: $3.50
1 teacher's guide: Code G7 $19.95
Also see ordering note below.

Subjects: *Assessment; Biology; Cells; Lenses; Life sciences; Light; Magnification; Microbiology; Microorganisms; Microscopes; Performance assessment; Portfolios; Science.*

1991

Abstract: This unit is one of 24 inquiry-centered science curriculum units developed for grades 1–6. Each unit provides children with opportunities to learn about topics in the physical, life, and earth sciences and technology through direct observation and experimentation. This unit, developed for grade 5, offers students experience in the use of hand lenses and simple microscopes while they investigate representative examples of microscopic life. Students discover the properties of lenses and become skilled in making slides and using microscopes as observation tools. Through their investigations, students learn about the difference in detail seen in organisms and other objects when viewed under different powers of magnification. Students also observe microscopic organisms from known cultures and hay infusions and prepare a section of onion skin to observe the organization of its cells. The teacher's guide contains 16 activities, each of which provides an overview of the activity, the objectives, background information, materials needed, preparation and procedural directions, extensions, and ways to evaluate student learning. The teacher's guide also describes post-unit assessments of student progress, includes an annotated bibliography of books for teachers and students, and provides directions for the care and feeding of live cultures. For each of the activities, a student activity book provides a "think and wonder" section, a materials list, a "find out for yourself" section which includes questions, procedures for setting up the activity, and an "ideas to explore" section. The student's activity book also includes several reading selections about microscopic organisms and the history of microscopy. (Author/KSR)

Assessment note: The assessment component of these books includes teacher observation checklists, performance evaluation, portfolios, and self-assessments. The teacher's guide also describes a post unit assessment that follows up the student brainstorming session held in lesson one. Students revisit the lists they generated at the beginning of the unit, analyze the statements for accuracy, and identify items that require correction.

Author: National Science Resources Center

Series: *Science and Technology for Children* (STC)

Reference no.: ENC-001494

Publisher: Washington, DC: National Science Resources Center

Evaluation: Field tested in the following schools: Albermarle County Public Schools, Albermarle County, VA (Greer School, Charlottesville, VA; Crozet School, Crozet, VA; Yancy School, Esmont, VA); Mesa Public Schools, Mesa, AZ (school names not listed); District 15, Palatine, IL (Frank C. Whiteley Elementary School, Hoffman Estates, IL); Alexandria City Public Schools, Alexandria, VA (John Adams Elementary School). Fall, 1989.

Ordering note: 1 complete unit: Order no.: G7-97-2701 $359.95. Each unit kit contains materials and apparatus, teacher's guide, and 15 student activity books.

Support: Unit specific in-service training for STC units available. For more information call (800) 227-1150.

Funding: Amoco Foundation, Inc. Dow Chemical Company Foundation. E.I. du Pont de Nemours and Company. Hewlett-Packard Company. John D. and Catherine T. MacArthur Foundation. United States Department of Defense. United States Department of Education

Source note: Gift of the Carolina Biological Supply Company

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Networks, Paths & Knots

Grades 6–9

Sunburst Communications, Inc.
101 Castleton Street, PO Box 100
Pleasantville, NY 10570
Telephone no.: (914) 747-3310
Toll-free no.: (800) 321-7511
Fax no.: (914) 747-4109
1 set: Order no.: 654203 $39.95
Also see ordering note below.

Subjects: *Assessment; Journals; Knots; Mathematics; Patterns; Problem solving; Process skills; Real world applications.*

1994

Abstract: This videotape is part of a series of five videotapes for students in grades 6–9. An accompanying teacher's resource book includes lessons that may be used in conjunction with the five videotapes. The series emphasizes active student involvement through mathematical exploration and experimentation and enables students to use patterns to create and predict situations. The purpose of the lessons in this video is to explore a field of mathematics that students can experience through exploration of what they might consider tricks or stunts. The video provides many examples of the use of networks: body systems, mail deliveries, electronic circuit boards, irrigation pipes, roads, and communications. Three problem-solving techniques are illustrated: modeling, experimentation, and trial and error. The video also includes Euler's eighteenth century investigation with networks and an example of mathematicians experimenting with simple materials (soap bubble models) to discover complex solutions to problems. The videotape may be used to motivate the accompanying lessons, or may be shown segment by segment as referenced in the lessons. Lessons contain curriculum links, computer software correlation suggestions, collaborative activities, student worksheets with solutions to problems, and extensive teacher notes. (Author/VN)

Assessment note: Assessment ideas include asking students to describe their observations, develop conjectures based on their observations, and create problems using the results. Students are also asked to describe various items algebraically and/or verbally, write journals, list real world examples of specific concepts, and conduct group discussions.

Author: Developed by the Nebraska Mathematics and Science Coalition under a cooperative Statewide Systemic Initiative agreement with the National Science Foundation (NSF); produced by the University of Nebraska, Lincoln Television, Learning Services Unit, Nebraska Educational Telecommunications Network; teacher's guide edited by Deborah J. Slade.

Series: *Math Vantage*, Patterns unit

Reference no.: ENC-001988

Ordering note: 1 additional teacher's resource book: Order no.: 661640 $14.95
1 complete Patterns unit set (5 videotapes, 1 teacher's resource book, and 3-10 packs of student worksheets): Order no.: 661603 $229.95

Funding: National Science Foundation (NSF)

Related resources: The *Math Vantage* series has units that cover different topics in math for the middle grades.

2D Visions in a 3D World Spatial Sense Unit (1 unit: $39.95; 1 set: $259.95)
This videotape is part of a series of six videotapes that explore and illustrate spatial concepts and relationships. An accompanying teacher's resource book includes lessons that may be used in conjunction with the six videotapes. This video illustrates several techniques of making two dimensional surfaces appear three dimensional: light and shadow, perspective, motion, and binocular vision. The video shows several arenas in which the translation between dimensional representations is important: art, video arcades, laparoscopic (videoscopic) surgery, air traffic control, and sky diving.

Puddle Questions: Assessing Mathematical Thinking, Grade 1

Grade 1

Creative Publications
5623 West 115th Street
Worth, IL 60482
Toll-free no.: (800) 624-0822
1 text: Order no.: 80481
$24.00

Subjects: *Arithmetic; Assessment; Communications; Data analysis; Data collection; Data interpretation; Estimation; Geometry; Mathematics; Measurement; Performance assessment; Probability; Problem solving; Process skills; Reasoning; Rubrics; Statistics.*

1994

Abstract: This resource book for instructors of grade 1 suggests open-ended activities designed to assess how students think, use tools, execute ideas, and communicate mathematically. These investigations focus on statistics, probability, measurement, estimation, reasoning, arithmetic, geometry, math language, and visual thinking. Sections on authentic assessment techniques and detailed teacher support allow the instructor to prepare, implement, and evaluate alternative performance assessments. Holistic scoring rubrics are given for each exercise. The book also includes follow-up activities to extend teachers' and students' learning, reproducible blackline masters in English and Spanish, record-keeping and observation forms, and a bibliography of additional resources. (Author/DDD)

Author: Joan Westley; writers, Susan Greer, Nancy Tune

Series: *Puddle Questions*, Math

Reference no.: ENC-001502

Audience: Bilingual students; English as second language (ESL) students; Hispanic American students

Language: English; Spanish

Source note: Gift of Creative Publications

Related resources: In addition to activity books for grades 1–6 in math, there is also a *Puddle Questions for Science* series for the elementary grades.

Puddle Questions for Science: Performance Assessment Investigations, Grade 4 (Order no.: 31385 $24.00)
This series of performance assessment books, designed for grades 2–6, provides open-ended activities designed to assess how students work through a complex investigation. These activities focus on science processes such as making careful observations, gathering data, conducting research, designing experiments, and interpreting results. This book for fourth grade includes topics from life, earth, and physical sciences. Included are sections on authentic assessment techniques and detailed teacher support allowing the instructor to prepare, implement, and evaluate alternative performance assessments. Holistic scoring rubrics are given for each investigation. Follow-up activities to extend student's learning, reproducible student sheets in English and Spanish, and record-keeping and observation forms are also included. (Author/RA)

The SIMMS Project: Level 4, Volume 1

Grades 10–12

Simon & Schuster Custom Publishing
160 Gould Street
Needham, MA 02194
Telephone no.: (617) 455-7000
Toll-free no.: (800) 428-4466
Fax no.: (617) 455-1707
1 student edition:
ISBN 0-536-58983-6 $7.80
1 teacher edition and assessment guide: $17.50

Subjects: *Assessment; Cartography; Chemistry; Circuits; Exponential growth; Frequency; Functions; Geometry; Graphing; Integrated/Interdisciplinary approaches; Interviews; Logarithms; Maps; Mathematics; Matrices; Mole; Periodic functions; pH; Physics; Portfolios; Precalculus; Problem solving; Quadratic equations; Rubrics; Science; Topology; Transformations.*

1995

Author: Based on the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989), the goals of this project include redesigning the 9–12 mathematics curriculum using an integrated interdisciplinary approach for all students and incorporating the use of technology in all facets and at all levels of mathematics and science. The *Systemic Initiative for Montana Mathematics and Science* (*SIMMS*) curriculum is written, revised, and reviewed by secondary teachers of mathematics and science. Materials encourage participation by women and members of ethnic minorities, and are intended for use by heterogeneous groupings of students. They are designed to replace all currently offered secondary mathematics courses, with the possible exception of Advanced Placement Calculus. Both levels three and four build on the content in level two, with level four designed for most students who plan to pursue careers in math and science. Students are asked to use coloring theory to solve problems in scheduling, organization, and cartography; examine radian measure and basic trigonometric functions; use matrices to explore the applications of transformational geometry in computer graphics; study elements of graphic design using polynomial functions and their corresponding graphs; and use logarithms to analyze, interpret, and convert complicated graphs. The student version is incorporated in the teacher edition. (Author/KFR)

Assessment note: Summary assessments are included for each module. For instance, in one module students are asked to design a capital letter W using polynomials and write a report detailing the functions used and their domains. Also included in the packet of materials is a guide to restructuring mathematics assessment in which veteran teachers have shared examples of their efforts to restructure assessment. Suggestions are given on implementing alternative assessment methods such as journals, interviews, and portfolios; and evaluation forms, checklists, and rubric forms are provided.

Author: Developed by Systemic Initiative for Montana Mathematics & Science (SIMMS); technical editor, Peter Fong

Series: *SIMMS* Project, Level 4

Reference no.: ENC-003420

Standards: NCTM Standards (1989)

Funding: National Science Foundation (NSF)

Other credits: *Restructuring Mathematics Assessment; Suggestions from the Classroom* by Sharon B. Whalen, James Hirstein

Source note: Gift of Simon & Schuster Custom Publishing

Teacher Resource Package IV, Level 3

Grade 4

The Wright Group
19201 120th Avenue, NE
Bothell, WA 98011-9512
Toll-free no.: (800) 523-2371
Fax no.: (800) 543-7323
1 resource package: Order no. 21840 $70.10
Also see ordering note below.

Subjects: *Aquatic organisms; Assessment; Bridges; Decision making; Earth science; Extended response; Forensic science; Frogs; Integrated/Interdisciplinary approaches; Life sciences; Literature; Measurement; Models; Observation; Performance assessment; Physical sciences; Plants; Prediction; Problem solving; Process skills; Science; Seasons; Soil; Space sciences; Technology; Water quality; Worms.*

1995

Abstract: This series of teacher resource packages contains thematically-developed lessons designed to help link subject areas across the curriculum while maintaining a focus on science by embedding science-related literature throughout the materials. Lessons and activities in this level, developed for grade 5, integrate and develop such skills as observation, prediction, modeling, interpreting, and controlling variables. Themes incorporated throughout these lessons include change, cause and effects, growth, conservation, and continuity and cycles. The units, which cover topics such as culturing and observing earthworms, dusting for fingerprints, designing a water filtration system, and building bridges, are presented in a sequence designed to make use of seasonal changes. An introduction to the program and its philosophy is provided in the resource package along with teaching notes for each of nine thematic units. Additional support booklets provide unit tests, portfolio ideas, activities using the metric system, and media resources. Activity and discussion cards provide the basis for the activity centers and include literature selections to be read individually or as a group, manipulatives, writing and graphing exercises, and hands-on experiments. Suggestions on how to supplement activity center materials are provided in the resource package. Student booklets include the literature selections, activity descriptions, and factoids. Extensions and blackline masters are provided for all lessons. (Author/DEB)

Assessment note: The assessment component of this series includes unit tests, self-evaluation, portfolios, consultation with parents or guardians; conferences between teachers and learners; and performance assessments. In addition, teachers maintain observation records such as anecdotal comments and checklists of learner's aesthetic, cognitive, skill, conceptual, emotional, and social development. The unit tests consist of data interpretation, problems, and extended answer items.

Author: Neil McAllister; general editor, Rod Peturson

Series: *Innovations in Science*, Level 3

Reference no.: ENC-003304

Evaluation: Field tested at the following schools: North Ridge Elementary School (Moreno Valley, CA); Tremont Elementary School (Dixon, CA); East Ridge Elementary (Woodinville, WA); Village Elementary School (Hilton, NY); Saratoga Elementary School (Springfield, VA); Bessie Rowell School (Franklin, NH).

Ordering note: 1 activity center: Order no.: 21839 $89.50; 1 student set (1 each of 7 titles): Order no.: 21804 $37.44. Items are also available for individual purchase. Contact the publisher for further information.

Source note: Gift of The Wright Group

Related resources: The *Innovations in Science* series has packages for grades 1–6, with activities where students act as paleontologists, analyze leaf shapes, and experiment with cabbage juice pH indicators.

The Universe: Exploring Stars, Constellations, and Galaxies

Grade 6

Scholastic, Inc.
PO Box 7502
Jefferson City, MO 65102-9968
Toll-free no.: (800) 325-6149
Fax no.: (573) 635-5881
1 unit kit: Order no.: RST-59316
$450.00
Also see ordering note below.

Subjects: *Assessment; Constellations; Earth science; Earth; Galaxies; Integrated/Interdisciplinary approaches; Journals; Language arts; Literature; Mathematics; Performance assessment; Portfolios; Process skills; Rubrics; Science; Space; Space sciences; Stars; Universe.*
1995

Abstract: *Science Place*, developed through a collaboration between Scholastic and the nation's leading science museums, is a hands-on, thematic, core K–6 program offering six complete kits for each grade. Each kit offers active, hands-on experiences to help students learn how to analyze and use information constructively and develop an understanding of life, earth, and physical science concepts that explain the world. The topic of this kit, designed for sixth grade, is exploring stars, constellations, and galaxies. Each kit includes books, a teacher's *Map to Exploration*, reusable exploration materials, *ScienceMats*, *Assessment Collection*, recording board, *Home Connection Collection*, videotape, description of the *Science Place* Program, and a bag. The books include *The Illustrated World of Space*, (provides photographs, colorful charts, and diagrams about the different heavenly bodies in the universe); *Stars, Clusters, and Galaxies* (describes how to observe the wonders of the night sky); and *The Universe* (illustrates how stars can be studied from Earth, how stars are grouped, their life cycle, and how the universe is changing). The teacher's *Map to Exploration* provides lesson plans for each book, includes thorough background information and options for exploration, and provides assessment options. *ScienceMats* provide reproducible sheets with pictorial directions for each exploration and a journal format for children to record their observations and conclusions. The *Assessment Collection* provides lesson assessment, baseline and follow-up assessment, a step-by-step guide for using portfolio assessment and performance assessment, observation records, rubrics, and a written test for each unit. The *Home Connection Collection* consists of letters (provided in multiple languages) to go home at the start of each unit to give families a snapshot of the unit explorations and concepts as well as family activities. The videotape features real kids using problem solving to introduce the unit's concepts. A guide is available with the videotape. The other grade 6 kits include *Human Development*, *Biodiversity*, *How Matter Changes*, *How Telecommunication Works*, and *The Cell*. (Author/RA)

Assessment note: The assessment component of this kit includes baseline, performance, connected thinking, and portfolio assessments as well as written tests. The baseline assessment evaluates where students are conceptually as they begin the unit. These reports are saved and used as part of the final assessment. Process performance is evaluated through written options such as student responses in journals and creative writing assignments, in addition to oral options such as observation, questioning, and discussion. The teacher's guide provides assessment charts, sample assessment questions, sample items to include in portfolios, and guidelines for evaluating portfolios and cooperative learning groups.

Author: Scholastic, Inc.; developed in cooperation with Houston Museum of Natural Science, Houston, Texas

Series: *Scholastic Science Place*, Cyan Level

Reference no.: ENC-003120

Audience: Bilingual students; English as a second language (ESL) students; HispanicAmerican students; Middle school teachers; Minority students

Ordering note: A complete kit includes: 25 copies student's *Maps to Exploration*, 1 teacher's *Map to Exploration*, 1 program guide, 1 *Home Connection Collection* packet, 1 *ScienceMats* book, 1 *Assessment Collection* book, 1 recording sheet, 1 video mystery, 1 video guide, 1 reference literature collection, 1 equipment package.

1 consumable kit: Order no.: RST27775 $70.00; 1 teaching system (Cyan level): Order no.: RST22937 $399.00; NOTE: The *Science Place* teaching system includes 1 program guide, six teacher's *Maps*, and six *ScienceMats*. 1 *Science Place* library (Grade 6): Order no.: RST62543 $45.00.

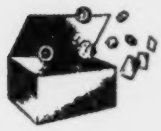
Source note: Gift of Scholastic, Inc.

Unlocking Whole Numbers: Volume 2

Grade 3

MECC
6160 Summit Drive North
Minneapolis, MN 55430-4003
Telephone no.: (612) 569-1500
Toll-free no.: (800) 685-6322
Fax no.: (612) 569-1551
1 software package: Order no.: MK902 $99.00
Also see ordering note below.

Subjects: *Arithmetic; Assessment; Computation; Interviews; Mathematics; Number sense/theory; Patterns; Prediction; Process skills; Writing.*



1994

Abstract: Designed for grade 3, this software package, the second in a series for grades K–6, allows students to explore mathematics in a multimedia environment that is designed to assist children in making the connection between physical objects and abstract mathematical concepts. This software links manipulatives (not included), symbolic notation, and writing tools so that students can learn to think and communicate mathematically. Content areas addressed in this volume include using the four arithmetic operations with whole numbers and base ten blocks, with properties of numbers (for example, odd), with the hundreds chart, and with money. A teacher resource guide, student activity masters, user's manual, and training videocassette are included. The software and blackline masters are available in both English and Spanish. This software is designed to support the National Council of Teachers of Mathematics (NCTM) goals by providing open-ended tools and curriculum materials that enable students to construct meaning from their experiences. *Unlocking Whole Numbers, Volume 1* covers the topics of counting, sorting, basic fact families, addition, subtraction, coin recognition, place value concepts, and number patterns. (Author/LDR)

Assessment note: Assessment suggestions reflect the belief that mathematical thinking is best evaluated through a variety of measures such as those that follow. Students choose their own work samples and explain why they are significant. Teachers observe students working independently and in groups and record their observations using checklists, forms, or written notes. Student interviews involve a planned sequence of questions designed to assess a specific skill. Students write a description of their solution(s) so that the teacher can analyze to what extent the student understands the problem, formulates a plan, and gets a reasonable answer. Student self-evaluation requires the students to list concepts they have learned during math class.

Author: Designed by Minnesota Educational Computing Corporation (MECC) and published as a cooperative venture with the Houghton Mifflin Company

Series: *MathKeys*

Publisher: Boston, MA: Houghton Mifflin Company

Reference no.: ENC-002774

Language: English; Spanish

Standards: NCTM Standards (1989). Content Standards: Grades K–4: Mathematics as problem solving; Mathematics as communication; Mathematics as reasoning.

Equipment: System requirements: Macintosh: Macintosh LC or later; minimum of 2MB RAM; System 7 or later; 32 bit Quickdraw; Color monitor; Hard drive; Macintosh compatible printer optional; if you intend to install this product on a file server, you also need: a Macintosh LC or later computer with a hard drive, connected to an AppleShare file server via AppleTalk/LocalTalk or EtherNet. (Because of network performance MECC recommends that EtherNet cabling be used. MECC does not recommend running MECC products for the Macintosh from a file server with AppleTalk/LocalTalk cabling.)

Ordering note: Orders by mail or fax only. Also available from Houghton Mifflin; for *MathKeys* information and ordering call (800) 733-2828.

Source note: Gift of Minnesota Educational Computing Corporation (MECC)

33

Using a Model & Estimating and Checking

Grades K–2

Educational Activities, Inc.
PO Box 392
Freeport, NY 11520
Telephone no.: (516) 223-4666
Toll-free no.: (800) 645-3739
Fax no.: (516) 623-9282
1 video: No.: E-VHS 262 $49.00
1 series (5 tapes):
No.: E-VHS 268 $229.00

Subjects: *Assessment; Cooperative learning; Disabilities; Equity; Estimation; Journals; Manipulatives; Mathematics; Models; Problem solving; Process skills; Rubrics.*

1993

Abstract: This program is intended for grades K–2, remedial intermediate, special education, and staff development. It comprises a 30-minute video, teacher's guide, and reproducible master copies. These lessons on using a model and estimating and checking feature a teacher and several students taking part in classroom activities utilizing manipulatives. The video proceeds at an adjusted pace to allow viewers to work along. All activities, materials, and concepts used in the video are explained in detail with onscreen cues. The teacher's guide includes a preface that discusses the methods and materials, as well as the rationale and objectives of the program (such as cooperative learning or journal writing). The guide also offers bibliographical suggestions for each lesson to connect mathematics to literature. The teacher's guide discusses the National Council of Teachers of Mathematics' view of the lesson concept, and provides a mathematical description and rationale. Lesson objectives and necessary materials are indicated, and detailed activities for before and after viewing the video are provided. (Author/SXA)

Assessment note: The accompanying guide stresses the importance of using a variety of assessment alternatives, suggesting that in turn educators will better understand children's strengths, needs, and attitudes. The guide suggests three assessment methods, a student attitude survey, kid watching, and journal writing. The Student Attitude Survey is included in the guide and is intended to help the educator monitor student attitudes at various times throughout the year. Kid watching is a strategy suggested to assist educators in evaluating student performance and behavior in manipulative tasks. A sample scoring rubric is provided. Journal writing can serve as material for student portfolios, as well as provide student feedback.

Author: Written by Ann Edson; director/producer, Denise Welborn

Series: *Math Problem Solving Strategies Using Manipulatives*

Reference no.: ENC-003989

Standards: NCTM Standards (1989). Content Standards: Grades K-4: Geometry and spatial sense; Estimation.

Source note: Gift of Educational Activities, Inc.

Windows on Math, Volume 2

Grade 2

Optical Data School Media
512 Means Street NW, Suite 100
Atlanta, GA 30318
Telephone no.: (404) 221-4500
Toll-free no.: (800) 524-2481
Fax no.: (404)221-4520
1 kit: Order no.: 574-4 $860.00
Also see ordering note below.

Subjects: *Addition; Assessment; Data analysis; Data collection; Division; Estimation; Fractions; Geometry; Interviews; Mathematics; Measurement; Multiplication; Number sense/theory; Numeration; Operations; Patterns; Portfolios; Problem solving; Process skills; Real world applications; Spatial ability; Subtraction; Time; Weights and measures; Whole numbers.*

1995

Abstract: This kit is volume 2 of the *Windows on Math* series and focuses on developing number sense, spatial sense, and children's problem-solving skills. Each volume of this series for grades 1–5 is a yearlong videodisc-based curriculum based on the Circle of Learning multisensory learning model and the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989). The Circle of Learning philosophy is that all students should be provided with opportunities to learn via their preferred learning style (kinesthetic, tactile, auditory, and visual). Each volume comprises a number of developmental and investigative units. The developmental units are designed to introduce new mathematical content related to such strands as numeration, operations, measurement, geometry and problem solving. Investigative units are designed to provide opportunities for applying mathematical understanding to other subject areas and real world situations. The lessons in each unit are correlated to the NCTM Standards for that grade level. Unique to the series are Video Time (developmental units) or Video Investigations (investigation units) activities which take particular advantage of videodisc technology. A barcoded Content Directory is also included in every volume with frame numbers, bar codes, and captions for each of the visuals as well as an index to the content of the program and a written overview for each segment. Lists of recommended materials for each lesson are also provided, and each volume contains a *Mathematics and Children's Literature* guide of activities. Volumes one and two include student activity cards in addition to the teacher unit guides and videodiscs. (Author/GMM)

Assessment note: Forms of assessment which are suggested include teacher observation, evaluation checklists, specific assessment activities, student self evaluation, teacher child interviews and conferences, and portfolios of children's work. The series provides blackline master observation checklists and questions for selected activities in the units.

Author: Executive producer, Stephanie Petron Cahill; writer/editors, Marsha E. Carlin, Leslie Wersein Hann; video producer, Marguerite L. Jarvis, Robert Michaels, Carmen Natale, Elizabeth Paxton; animation producer, Julie A. Libman; authors, Jack Hope, Marian Small; Illustrators, Elaine Jones Heinl, Lori J. Pullis-Rummel; animation and graphics, Christopher M. LaPanta

Series: *Windows on Math*, Volume 2

Reference no.: ENC-006416

Language: English; Spanish

Standards: NCTM Standards (1989). Content Standards: Grades K–4: Mathematics as problem solving; Mathematics as communication; Mathematics as reasoning; Mathematical connections; Estimation; Number sense and numeration; Concepts of whole number operations; Whole number computation; Geometry and spatial sense; Measurement; Statistics and probability; Fractions and decimals; Patterns and relationships.

Equipment: Requires: Laserdisc player and color monitor; barcode reader. System requirements: Macintosh: 68030 processor or better; System 7.0 or above; 4 MB RAM; 10 MB free space on hard drive; color monitor. Windows: IBM or compatible computer; 386 or above; Windows 3.1 or above; DOS 6.0 or higher; 4 MB RAM; 10 MB free space on hard drive; color monitor; mouse.

Ordering note: Kit includes 3 videodiscs, several print guides, planning charts, and activity cards. Call publisher to order manipulatives, related trade books, transparencies, and software.

Source note: Gift of Optical Data School Media

A World to Measure: Exploring Measurement to Help Us Understand Our World

Grade 2

Scholastic Inc.
PO Box 7502
Jefferson City, MO 65102-9968
Toll-free no.: (800) 325-6149
Fax no.: (314) 635-5881
1 kit: Order no. RST-59512 $350.00
Also see ordering note below.

Subjects *Area; Arithmetic; Assessment; Computation; Data analysis; Extended response; Fractions; Journals; Length; Logical reasoning; Mathematics; Measurement; Performance assessment; Portfolios; Process skills; Real world applications; Rubrics; Units; Volume (Mathematics).*
1995

Abstract: *Math Place,* a collaboration between Scholastic and leading mathematics educators, offers kits for grade levels K–2. This unit is one of six units developed for grade 2 and is designed to teach the concepts of measurement through making comparisons and finding solutions to problems by using standard units to measure length, developing and using two-dimensional units to measure area, and using nonstandard and standard units to measure volume and capacity. Students can discover, via video, that mixing and cooking muffins for a large number of people requires accurate measurement for each muffin to look and taste alike. This kit includes a teacher's map to exploration that provides lesson plans and options for exploration; *MathMats* includes *PlaceMats* for recording investigations of questions and problems, *ThinkMats* for providing additional opportunities to develop higher-level thinking skills, and *SkillMats* for providing children with additional experiences in measure concepts and operations; lesson resources for additional information and extension of concepts; *Home Connection Collection* containing letters (provided in multiple languages) to state the mathematical concepts being studied and related family activities; and two audiocassettes: one narrates the story in a big book about fractions, and the other provides an overview of materials needed, and lesson concepts and strategies. Integration suggestions are in the resource manual. The other second grade kits include *Numbers, Numbers*; *Math Museum*; *Trash Plans*; *Data News*; and *Numbers in the Wild.* (Author/LDR)

Assessment note: This series uses a preassessment that presents some of the number concepts and operations that children will encounter in the unit. Teachers will be able to identify where each child is in his or her development of number concepts and operations. The kit contains assessments for each activity and for overall units, including hints for observation, questions for surveys and informal assessments, prompts for student journals, and self assessments. Porfolio and performance assessments are also used. The kit also contains a math assessment card for teachers to track a child's grasp of the unit's basic math concepts.

Author: Scholastic Inc.

Series: *Scholastic Math Place, Real World Math for Thinking Kids,* Blue level

Publisher: Jefferson City, MO: Scholastic Inc., published in cooperation with the Boys & Girls Clubs of America

Reference no.: ENC-006406

Language: English; Spanish

Ordering note: 1 A medir el mundo! kit: Order no.: RST59806 $420.00
1 Blue level classroom manipulative kit: Order no.: RST55711 $369.00
1 Blue level consumable kit: Order no.: RST59925 $30.00
1 Blue level grade level set: Order no.: RST59643 $875.00
Set includes all components for the six units except little books of exploration, little trade books, and manipulatives.

Source note: Gift of Scholastic, Inc.

Professional Development Materials

These materials from the ENC collection are just a sampling of the resources available to help teachers understand what the different types of assessment are, how they can best be used, and why these assessments are essential to the improvement of math and science teaching. To find more materials through the Resource Finder for professional development, try searching on the subject keywords "professional development" and "assessment."

1996 Iowa Assessment Handbook

Editors, Chin-tang Liu, Jackson Lieu, and Robert E. Yager, 1996

This handbook addresses the assessment of student performance and the establishment of criteria by which to measure student progress in six domains within science: concepts, processes, applications, attitude, nature of science, and creativity. Each domain is defined and a rationale section, with supporting research and classroom implications, is provided for assessing learning in that domain. Within the descriptive section, examples of instruments, including multiple choice, essay, and alternative forms of assessment are provided.

Assessment Office Science Education Center
University of Iowa, 761 Van Allen Hall
Iowa City, IA 52242
Telephone no.: (319) 335-0254
Fax no.: (319) 335-1188
1 book: $15.00 (includes shipping)

Alternative Assessments in Practice Database

National Center for Research on Evaluation, Standards, and Student Testing (CRESST), 1993

This searchable database (HyperCard) allows access to and retrieval of information about current efforts to develop alternative assessments in science, mathematics, English and language arts, social studies, and fine arts. Each database entry contains: contact information; subject matters and specific topics areas assessed; assessment purpose; student grade levels for which assessment is intended; special student groups for whom the assessment is being designed and with whom the assessment is being used; cognitive skills assessed; student response mode; administrative context and requirements; characteristics of scoring; and developmental status.

CRESST/UCLA, Graduate School of Education
10920 Wilshire Boulevard
Los Angeles, CA 90024-6511
Telephone no.: (310) 206-1532
Fax no.: (310) 825-3883
1 copy: $15.00

Assessing Hands-On Science: A Teacher's Guide to Performance Assessment

Janet Harley Brown, Richard J. Shavelson, 1996

This book provides an opportunity to learn how to use performance assessments to measure student learning in a hands-on curriculum. The book opens with a discussion of the rationale for performance assessments, then provides reflective exercises for teachers to complete to help them determine the kinds of assessments appropriate for their classrooms. Additional chapters provide examples of how traditional and performance assessments would approach the same material, the components and characteristics of performance assessments, and analytic versus holistic scoring systems.

Corwin Press Inc.
2455 Teller Road
Thousand Oaks, CA 91320-2218
Telephone no.: (805) 499-9774 or (805) 499-0721
Fax no.: (805) 499-0871
1 book: Order no.: DA607 64439 $25.00

Assessing Student Outcomes: Performance Assessment Using the Dimensions of Learning Model

Robert J. Marzano, Debra Pickering, Jay McTighe, 1993

This book describes how to design a performance assessment system that supports the Dimensions of Learning instructional framework for grades 1–12. This framework or model is based on the premise that five types of thinking are essential to the learning process: positive attitudes and perceptions about learning, thinking involved in acquiring and integrating knowledge, thinking involved in extending and refining knowledge, thinking involved in using knowledge meaningfully, and productive habits of mind. This document discusses the five dimensions of learning, what they imply about effective instruction, and the relationships between the five dimensions. This book also provides a detailed description of how to construct performance tasks, rubric development, and includes examples of performance tasks that cover all disciplines.

Association for Supervision and Curriculum Development (ASCD)
1250 N. Pitt Street
Alexandria, VA 22314
Telephone no.: (703) 549-9110
Toll-free no.: (800) 933-2723
Fax no.: (703) 299-8631 or 299-8632
1 book: Stock no.: 61193179 $13.95 (members)/$16.95 (nonmembers) $2.50 shipping and handling

Professional Development Materials

Assessment in Elementary School Science Education

Senta A. Raizen, Joan B. Baron, Audrey B. Champagne, Edward Haertel, Ina V.S. Mullis, Jeannie Oakes, 1989

This document, developed by The National Center for Improving Science Education (NCISE) for elementary school teachers, discusses topics associated with assessment such as why it is important, how and what to assess, and using it as instruction. The NCISE mission is to promote changes in state and local policies in science curriculum, science teaching, and the assessment of student learning in science. The emphasis of this document is on using assessment to enhance, not undermine instruction.

The NETWORK
300 Brickstone Square, Suite 900
Andover, MA 01810
Toll-free no.: (800) 877-5400
Fax no.: (508) 475-9220
1 book: Order no.: 303-E $14.50

Assessment Standards for School Mathematics

Prepared by the Assessment Standards Working Groups of the National Council of Teachers of Mathematics, 1995

This is the third book in the National Council of Teachers of Mathematics (NCTM) Standards series. It has been developed as a guide for examining current assessment practices and planning new assessment systems. It is based on extensive recent research and developments related to national efforts to reform the teaching and learning of mathematics. Instead of assuming that the purpose of assessment is to rank students on a particular trait, the new approach suggests that teachers can set high expectations that every student can achieve; different performances can and will meet agreed on expectations; and teachers can be fair and consistent judges of students' performances. An important theme in the Assessment Standards is that the assessment of students' achievement should be based on information obtained from a variety of sources, and that much of this information should be gathered by teachers during the process of instruction. Six standards for assessment are described: mathematics, learning, equity, openness, inferences, and coherence.

National Council of Teachers of Mathematics
1906 Association Drive
Reston, VA 20191-1593
Telephone no.: (703) 620-9840
Toll-free no.: (800) 235-7566
Fax no.: (703) 476-2970
1 book: Order no.: 593 $15.00

Assessment Techniques: Beginning Number Concepts

Author, Kathy Richardson; illustrator, Jeannie Brunnick, 1990

This video and study guide (one of a two-video set) helps teachers take a closer look at the varying developmental levels of children's thinking and understanding of number concepts while providing a model for appropriate assessment techniques. The goal of this video is to provide a starting point and a stimulus to teachers as they seek to know more about their students. By using Unifix Cubes for estimating, counting, counting on, counting back, number relationships, and comparing numbers, teachers may determine the depth of children's understanding of number sense concepts. The study guide provides related questions as well as an edited transcript of video conversations and related concepts.

Educational Enrichment
770 West Rock Creek Road,
PO Box 1524
Norman, OK 73070
Toll-free no.: (800) 292-6022
Fax no.: (800) 292-8846
1 video: $79.95 (plus 10% shipping)/1 set: $139.95

Authentic Assessment in Practice: A Collection of Portfolios, Performance Tasks, Exhibitions, and Documentation

Compiled by Linda Darling-Hammond, Lynne Einbender, Frederick Frelow, Janine Ley-King, 1993

This book contains sample performance assessments for grades 1–12 in science, mathematics, social studies, writing, and drama from a number of sources. Assessment formats include exhibitions, projects, on-demand performance assessments, and portfolios. Reprints of papers that discuss characteristics of authentic assessment, performance task design, and portfolios are provided. Samples of documentation of learning over time using performance assessment are also included.

National Center for Restructuring Education, Schools, and Teaching (NCREST)
Box 110, Teachers College, Columbia University
525 West 120th Street
New York, NY 10027-6696
Telephone no.: (212) 678-3432
Fax no.: (212) 678-4170
1 book: $15.00 plus shipping and handling

Professional Development Materials

Authentic Assessment Strategies for Elementary Science & Mathematics: A Beginning

Edited by Carol Cullen, Pat Barron; compiled by the Science & Mathematics Network of Central Ohio, 1994

This resource for grades 1–5 contains authentic, performance-based assessment plans for science and mathematics which were developed in cooperation between teachers, business partners, and students. These assessment plans were implemented in specific classrooms, evaluated, and revised through a variety of multilevel review procedures. Tasks and scoring criteria were developed to relate directly to instructional goals identified as desired student outcomes, require students to apply what they had learned, have more than one correct answer or possible outcome, and involve more than one step to complete.

EDRS
7420 Fullerton Road, Suite 110
Springfield, VA 22153-2852
Telephone no.: (703) 440-1400/Toll-free no.: (800) 443-3742
Fax no.: (703) 440-1408
1 book: Order no.: ED-389525 $19.85

CRESST Performance Assessment Models: Assessing Content Area Explanations

Eva L. Baker, Pamela R. Aschbacher, David Niemi, and Edynn Sato, 1992

This guide has been developed from research designed to explore the development of alternative assessments in the content area of history. The document provides an overview of the CRESST research and guidelines for duplicating their technique for developing alternative assessments with other content areas.

CRESST/UCLA, Graduate School of Education
10920 Wilshire Boulevard
Los Angeles, CA 90024-6511
Telephone no.: (310) 206-1532
Fax no.: (310) 825-3883
1 book: $10.00 plus $1.50 shipping and handling

How to Assess Student Performance in Science: Going Beyond Multiple Choice Tests

Wendy McColskey and Rita O'Sullivan, 1993

The purpose of this manual is to encourage discussions among science teachers about desired student outcomes in science and assessments appropriate to those outcomes. This publication is designed to help teachers consider a variety of possible student outcomes in science; reflect on and choose appropriate ways to assess students' performance; develop appropriate criteria for judging student work; reflect on grading practices; and consider ways to get schools and teachers started in changing practices.

SERVE, Florida
345 S. Magnolia Drive
Tallahassee, FL 32301
Telephone no.: (904) 671-6094/Toll-free no.: (800) 352-6001
Fax no.: (904) 671-6020
1 book: Order no.: RDSPS $8.00

Improving Science and Mathematics Education: A Database and Catalog of Alternative Assessments

Database design & development by the Laboratory Network Program, 1995

This database and accompanying document contain descriptive information on 208 alternative assessments in science and mathematics. The assessments cover all grade levels and were developed by teachers, school districts, state departments of education, national governments, universities, and research and development institutions. Specific information about each instrument includes background information; tasks that students perform; scoring; and reporting, technical information, and availability. The manual also includes information about using the database and about reviewing and analyzing the assessments described in the database. Entries do not include actual test items.The database requires Filemaker Pro (from Claris) software for use.

Northwest Regional Educational Laboratory
101 SW Main Street, Suite 500
Portland, OR 97204
Telephone no.: (503) 275-9557/Toll-free no.: (800) 547-6339
Fax no.: (503) 273-9489
1 copy: $18.30

Improving Science and Mathematics Education: A Toolkit for Professional Developers: Alternative Assessment

Laboratory Network Program, 1994, 1995

This professional development resource book is a compilation of activities and supporting materials developed as an alternative assessment resource and as a means of engaging teachers in dialogue about changing the ways mathematics and science have been traditionally taught and assessed. The emphasis is on alternative means of assessment such as short answer, essays, performances, oral presentations, demonstrations, and portfolios. The goals of the toolkit are: to provide information on the basics of assessment; provide information on the types of assessment being developed and illustrate the variations with examples; discuss the issues and considerations surrounding the development and use of alternative assessment; emphasize the monitoring functions of alternative assessment as well as the instructional potential; assist users in developing a vision of what alternative assessment should be; and provide professional development activities, such as workshops and long term training, that allow educators to construct their own understandings of the nature and role of alternative assessment.

Northwest Regional Educational Laboratory
101 SW Main Street, Suite 500
Portland, OR 97204
Telephone no.: (503) 275-9557/Toll-free no.: (800) 547-6339
Fax no.: (503) 273-9489
1 copy: $60.60 (includes 1995 *Toolkit Addendum*)

Professional Development Materials

Mathematics: Assessing Understanding

Developed by Marilyn Burns, 1993

This series of three videotapes and a discussion guide has been developed as a resource for planning and delivering workshops for K–6 elementary school teachers interested in assessing students to correspond to recommendations found in the National Council of Teachers of Mathematics (NCTM) Standards. The videotapes use interviews of students to provide models for the kinds of questions that can reveal what students do and do not understand including being able to apply numerical understanding to problem- solving situations and to explain their reasoning.

Cuisenaire Company of America, Inc.
PO Box 5026
White Plains, NY 10602-5026
Telephone no.: (914) 997-2600/Toll-free no.: (800) 237-3142
Fax no.: (914) 997-2192
1 series: $225.00

Mathematics Assessment: Myths, Models, Good Questions, and Practical Suggestions

Edited by Jean Kerr Stenmark, 1991

Curricular and instructional changes envisioned in the National Council of Teachers of Mathematics (NCTM) Standards must be accompanied by substantive changes in assessment policies, procedures, and instruments. This booklet is a collection of examples of assessment techniques that can serve as tools for improving the teaching and learning of mathematics.

National Council of Teachers of Mathematics
1906 Association Drive
Reston, VA 20191-1593
Telephone no.: (703) 620-9840/Toll-free no.: (800) 235-7566
Fax no.: (703) 476-2970
1 book: Order no.: 505 $8.50

Measuring Up: Prototypes for Mathematics Assessment

Mathematical Sciences Education Board, National Research Council (NRC), 1993

This book is for developers of tests and other assessment instruments, teachers, and university-based educators responsible for prospective teachers. The book provides examples of tasks, hypothetically directed towards the fourth grade level, that can be used to assess mathematical skills and knowledge as expressed in the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (1989) The nature and selection of the prototypes in this volume are based on mathematical content, mathematical connections, thoughtful approaches, mathematical communication, rich opportunities, and improved instruction.

National Academy Press
2101 Constitution Avenue NW
Washington, DC 20055
Telephone no.: (202) 334-3313/Toll-free no.: (800) 624-6242
Fax no.: (202) 334-2451
1 text: ISBN 0-309-04845-1 $10.95

Measuring What Counts: A Conceptual Guide For Mathematics Assessment

Mathematical Sciences Education Board, National Research Council, 1993

This book is meant for use by mathematics educators at all levels. It aims to advance the national discussion on assessment by establishing crucial research based connections between standards and assessment. It demonstrates the importance of content, learning, and equity, three key principles for any program of assessment that is intended to support the national educational goals. The message of the book is simple: assessment in support of standards must not only measure results, but must also contribute to the educational process itself.

National Academy Press
2101 Constitution Avenue NW
Washington, DC 20418
Telephone no.: (202) 334-3313/Toll-free no.: (800) 624-6242
Fax no.: (202) 334-2451
1 book: ISBN 03-090-4981-4 $17.95 plus shipping and handling

National Science Education Standards

National Research Council (NRC), 1996

The National Science Education Standards, developed for grades K–12, present a vision of a scientifically literate populace and are guided by the following principles: science is for all students, learning science is an active process, school science reflects the intellectual and cultural traditions that characterize the practice of contemporary science, and improving science education is part of systemic education reform. The document consists of an introduction including goals for school science, underlying principles, perspectives and definitions, organization, and six categories of standards. The standards cover the topics of science teaching, professional development, assessment, science content, science programs, and systems and describe the conditions necessary to achieve the goal of scientific literacy for all students, including opportunities for students to learn and for teachers to teach. The science assessment standards in particular are criteria against which to judge the quality of assessment practices and can be used as guides in developing assessment practices and policy.

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On the Internet

Assessment and Accountability

http://www.nwrel.org/eval/index.html

Developed by NWREL (Northwest Regional Educational Laboratory), this Web site contains lengthy bibliographies on assessment for several subject areas as well as a detailed rubric for assessing analytical writing. The *Alternative Assessment Toolkit: A Sampling* is also included, with several sample problems and questions along with background information for teachers, scoring guidelines and correlations to the NCTM Standards in the math section.

ERIC Clearinghouse on Assessment and Evaluation

http://www.cua.edu/www/eric_ae/

This World Wide Web site provides information and resources pertaining to educational assessment, evaluation, and learning theory. Featured are sources to locate and evaluate tests; pointers for searching various ERIC databases on the Internet; measurement and evaluation news; and full-text essays on assessment topics.
The Web site also includes a digest article identifying Internet resources of particular interest to the assessment community.

An Introduction to Science Portfolios

http://www.gene.com/ae/21st/TL/

This resource, part of Genentech's Access Excellence (AE) Web site for biology teaching and learning, discusses why portfolios should be used as assessment tools and how to implement them in science classrooms. The site also has guidelines developed by the California State Department of Education for use of portfolios in the Golden State Examination, relevant Web links, and a discussion area in the AE Teacher's Lounge.

Miami Museum of Science–The pH Factor

http://www.miamisci.org/ph/default.html

Developed for K–12 teachers by the Miami Museum of Science, this resource contains background information, lesson plans, and activities about pH. The site is designed around the Seven E's, a constructivist approach to learning where students build new learning based on their prior experiences. The "Examine" icon provides ideas for alternative assessments such as performance-based assessment, authentic or project assessment, portfolios and journal assessments.

NSTA: Scope, Sequence, and Coordination

http://207.22.231.50:80/nsta_ssandc/

At this site, teachers can download materials designed to meet the National Science Education Standards (NSES). These Micro-Units have components for both teachers and students and include assessments. Teachers can also learn more about the NSES and the SS&C Project.

Pathways to School Improvement

http://www.ncrel.org/sdrs/pathways.htm

Pathways (a product of the North Central Regional Educational Laboratory, or NCREL) addresses critical issues identified by educators, researchers, and community leaders. National leaders in each area provide practical, research based solutions to these issues. Contributions to this site come from America's leading educational research centers and universities. Mathematics and science topics include: locating, using, and integrating Internet based materials; providing hands-on and authentic learning experiences; implementing curriculum, instruction, and assessment standards for math and science education; and ensuring equity and excellence in mathematics and science.

Pump Curriculum Home Page

http://sands.psy.cmu.edu/ACT/awpt/pump-home.html

The Pittsburgh Urban Mathematics Project (PUMP), a collaboration of the Anderson Research Group and teachers in the Pittsburgh public schools, is an attempt to make high school algebra accessible to all students through the use of situational curriculum materials and an intelligent computer based tutoring system. Students are assessed on their performance on group tasks in the classroom, individual on demand performance tasks, portfolios, and their work on the computer tutors, as well as the more traditional homework and tests.

Whelmers

http://mcrel.org/whelmers/

Developed for grades K–12, this site contains teacher demonstration activities (Whelmers) intended to inspire students by sparking their curiosity about science. Whelmers are designed as a tool to be used by a classroom teacher to engage students and to draw their attention from the incredibly busy and hurried lifestyle we all experience. Each month through September 1996, five new science activities will be posted, along with assessments, coauthored by Steven L. Jacobs and Marty Henry.

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States Served: Kentucky, Tennessee, Virginia, West Virginia

Far West Region
WestEd Eisenhower Regional Consortium for Science and Mathematics Education
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730 Harrison Street
San Francisco, CA 94107
Phone: (415) 241-2730/Fax: (415) 241-2746
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Research for Better Schools
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